EXTRACT FROM PREFACE TO SECOND EDITION.

The fact that the authors have treated their subject largely from the genetic point of view needs no apology. More and more is the importance of the treatment given to the child coming to be recognised in connection with social problems, and more and more will it become manifest that the individual failures and shortcomings which are the root of our social troubles are largely due to wrong directions given to those psychic forces present in the child from the beginning. Collectively we know something of the laws of the body; and this knowledge, if it were applied, is amply sufficient to prevent a great deal of the physical pain still existing around us. The mind has its laws no less than the body, and although our knowledge of them is even more fragmentary, yet by the application of those we do know, much mental pain, abortion, and even destruction might be prevented. In the child mental processes are most easily studied because less complicated, and because running over more quickly into action than is the case with the adult. On the child also external influences are more easily brought to bear, and it is through an intimate know-

ledge—a knowledge still far from being fully attained—of the ways in which these influences enter as moulding forces into the life of the growing child that practical psychology must make its contribution towards the improvement of society.

With respect to the fundamental question of the connection between mind and brain the scientific hypothesis is that for every mental act there is a definite brain change. This assumption is obviously necessary as a pre-supposition of histological investigation, and no one would question that it is justified throughout a large part of the field. But it is far from being proved to hold universally, and the tendency of present-day thought is beginning to run strongly against its uncritical acceptance.

The same conclusion may be illustrated from recent philosophical thought by reference to Bergson. The practical tendency of his philosophy is to emphasise the fact that the brain does not fully represent or symbolise the self. His critical work on the phenomena of aphasia is particularly illuminating on this point, while his doctrine of the *élan vital* is wonderfully suggestive for the educator. The essential nature of mind consists in its creative functions, which are inexhaustible.

October 1909.

EXTRACT FROM PREFACE TO FIRST EDITION.

We have throughout accepted growth or development as the fundamental characteristic of the mind; and this growth we view as essentialy a process of action and reaction between the mind and its environment. By its own self-activity the mind in a very literal sense creates its own world; and for this reason, no less than for purposes of exposition, we have placed the treatment of activity earlier than is customary. The student who has not an inborn analytical faculty always finds the psychology of sensation and perception the hardest part of the subject; for in common life he scarcely ever puts himself in the psychological attitude with regard to them. Meeting thus with peculiar difficulties at the outset, he is often permanently discouraged. His activities and feelings, on the other hand, he does frequently examine, and is more prepared to understand the psychological difficulties to which they give rise.

At the same time, the order of our chapters may be varied; and whatever order is adopted the fundamental difficulty of all psychological exposition still remains—viz., the *interaction* of psychical phenomena. We have to deal separately with processes which in

reality are always varying concomitantly and mutually affecting one another.

We have taken pains to encourage the student who uses this book to do some genuinely psychological thinking for himself, and to make him dissatisfied with lifeless and superficial ideas, such as those which unfortunately still abound in the work of Examination-candidates in this subject.

We have also had in view the treatment of the subject usually required by the course of instruction for the Ordinary Degree in British Universities and Colleges. The book is intended to show the "open door," and lead on naturally to a serious study of one or other of the main branches of modern psychology. The works referred to for further study have been selected as those most suitable and most accessible to English readers, and as themselves supplying reliable references to authoritative foreign works.

Our view of psychic life has compelled us to regard the questions we have raised mainly from the genetic point of view; hence we trust that the student of Education will find that, although we have been prevented by considerations of space from drawing in any detail the practical deductions with which any vital treatment of the subject of psychology must abound, yet we have set forth the material in such a way as to aid him in applying his knowledge of the laws of mind to the practice of his own art.

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PASSAGES in small print may be omitted by those who are reading the subject for the first time.

The student is reminded that the index is intended to be used. When reading a particular topic, he should consult the index in order to compare incidental references which have been made to it in other parts of the book.

ELEMENTS OF PSYCHOLOGY.

CHAPTER I.

INTRODUCTION.

§ 1. *What is Science?*—A Science is a systematic and formulated body of knowledge that has been acquired on a certain subject. Thus the science of Astronomy includes all that is known about the stars, and aims at setting forth that knowledge in a systematic way. Botany treats of plants, Zoology of animals, Physics of matter and energy: every science draws an imaginary line round a certain selected portion of the universe, and sets to work to compare and to classify the objects found therein, to find out how they are related to one another,—in a word, to transform what at first appears a chaos into an ordered cosmos.

Observation, comparison, and classification are the primary activities of the scientist. When Linnæus perceived that there were certain broad likenesses between different plants which enabled him to arrange them in families, when Mendeléeff discovered that the chemical elements could be grouped in accordance with what is known as the Periodic Law, these great men

undoubtedly made notable contributions to the advance of the sciences of Botany and Chemistry. But if we think of this descriptive work as being anything more than the bare foundation of science we shall make a great mistake. Nature is not like a huge store-house of tumbled treasures awaiting the shelves and the cabinets of the orderly curator. It is the ceaseless change in nature, the growth and decay, the eternal becoming, that presents the most arresting challenge to man's intellect. We are not content to know merely what happens: we must know why that particular thing happens and no other. Explanation is the ultimate aim of Science.

Explanation means that the event under consideration is rendered intelligible to us. In its most primitive form it usually consists in a generalisation. When we can say all gases expand when heated, or all beech trees shed their leaves in winter, or all animals die, we are apt to feel that the expansion of a particular gas, the falling of the leaves of a particular tree, the death of a particular animal are explained. The wider the generalisation, the more satisfied we are. And when we can express our generalisation in terms of quantitative correspondence, as in the laws regulating the pressure and temperature of gases, we have a sense of great achievement.

The wide generalisations of Science are known as Natural Laws or Principles. They are not like the laws of man, which can be and often are broken. The laws of nature express the being of things and cannot be broken. This of course is not to say that we may not be mistaken in the formulation of a law. An apparent breach may be due either to such a mistake or to our ignorance of an operating factor. At the

stage that human knowledge has now attained a discrepancy between a calculated result and an actual result is one of the sources of new discoveries, as in the case of the planet Neptune or the element Argon.

A second mode of explanation consists in imagining a model which to our minds would account for observed phenomena. Thus to account for the observed phenomena of light, scientists have invented the ether, an imponderable substance which fills space, and which propagates through space in the form of undulatory motion the energy of the sun. Again, for untold ages the problem of the ultimate structure of matter has appealed to man's imagination. The little hard atom of Lucretius has become the miniature universe of the physicist of to-day, but exactly how far reality corresponds to those mental constructions of ours is a question which we cannot answer. Such models are ways of thinking, and we may regard them as true constructions just so far as they serve to direct our further investigation and enable us to foretell results.

In attempting to explain the universe in which he finds himself, man takes for granted that it is explicable in terms of his intellect. This is the fundamental assumption of Science. It is an assumption that cannot be proved: it is one that at first sight seems obviously false, so numerous are the contradictions and inconsistencies of the world as we perceive it. But the removal of the contradictions and inconsistencies by the constructions of science is at once a justification of the assumption and a proof that the scientific theories in question are not mere works of imagination. So firmly established in men's belief have certain of these scientific conceptions become that, to select one example, the ether is regarded by some as equally real

with matter and energy, and as much more real than mind.

Each science demands self-consistency within its own sphere; but it is obvious that this would not satisfy us if there were contradictions between the principles maintained by the different sciences. Hence our need for a science of sciences, a science of ultimate reality, a science which shall criticise the constructions of the special sciences, bring them into relation with one another, and accept them or modify them until consistency is attained. The endeavour to attain to such a science has always formed an essential part of the study known as Philosophy.

§ 2. *What is Psychology?*—The group of sciences which attempt in the way that we have indicated to explain the universe includes the one to which this book is an introduction, namely Psychology. Like the others, Psychology has its own sphere of work, its own chosen objects: it makes its own generalisations, it forms hypotheses, it invents mental constructions to explain facts of observation. As its name denotes, the objects of its interest are not material but mental: the psychologist concerns himself with the processes that go on within his own mind, with seeing, hearing, feeling, thinking, imagining, reasoning.

It will easily be seen that psychology differs in certain important respects from the other natural sciences. In the first place, the objects with which it is primarily concerned must be studied not through the senses, but by direct experience of the objects themselves. The early psychologists regarded the distinguishing and naming of the mental processes of which we are aware as analogous to the distinguishing and naming of those objects which we see in the external world. Hence

they called the method of observation used in psychology a "looking within" or *introspection*. This is the fundamental method of observation in psychology without which we could not make a beginning.

The method of introspection, however, gives only the beginning. We want a science of *mind*, not of any individual mind. The generalisations that we make through study of our own minds may be true of all human minds, but we cannot take their truth for granted. Hence besides introspection, we must employ the same method of observation as the other sciences in such a way as to lead us to general conclusions about our selected subject matter. At a very early age each one of us comes to the realisation of the fact that other people have feelings, thoughts, desires, wishes, just as we ourselves have; and we begin to form shrewd guesses at the nature of these mental processes of theirs in particular circumstances. If we reflect for a moment we shall see that these guesses of ours depend to a great extent upon observation. We notice the conduct of other people, and from it we infer that they are thinking or feeling in this or that way. Observation of human conduct with a view to explaining it is part of the business of the psychologist.

Any product of human activity may be regarded as part of this conduct which has to be studied. Houses, trains, motor cars, aeroplanes, bear the stamp of human thought and human skill. Those who excavate buried cities or the tombs of kings undesecrated by Time can from these relics tell much about the mentality of the people who built them. Chief among the products of value to the psychologist must be reckoned language, spoken and written. Biographies, autobiographies, fiction, drama, even historical and scientific works, in a

word, all literature provides material for the psychologist who seeks to work his way from the product to the producing mind. Of more direct value are descriptions spoken or written by persons skilled in self-observation of the processes going on within their own minds. Such descriptions enable comparisons to be made and exceptions to be noted.

The founding of psychology on introspection involves us in a difficulty which does not meet workers in other sciences. Two botanists can observe the same primrose but two psychologists cannot observe the same mental process. Fear, as I know it in my mind, may be radically different from fear as you know it in your mind. Consequently, though we use the same word, we may really be talking about quite different things. So serious is this difficulty that some scientists have attempted to abjure introspection altogether, and to limit observation in psychology to what can be observed outside ourselves. We should then study mind in man much as we should study it in a butterfly or some organism whose mentality we have no reason to think is in any way like ours. This is the position of the "Behaviourist" to whom further reference will be made later. There is certainly great need for caution in dealing with the results of introspection, but to the writers of this book it does not seem either possible or desirable to dispense with introspection as a method of observation.

Another difficulty for the psychologist arises from the evanescent character of the matter available for introspection. As a rule our minds are active; thoughts, feelings, desires, change from moment to moment; inactivity, stillness, seems to spell sleep or trance. Mental processes cannot be detained for observation

like the rocks of the geologist or even the plants of the botanist. They may vanish entirely when we seek to observe them.

This fact suggests another difficulty peculiar to introspection, namely, that introspection implies a cleavage in the mind of the observer. For the observer and the observed are one. In ordinary scientific observation we go out in a unified process towards our material; the whole stream of our attention engulfs it; we lose all sense of self. But in introspection what is observed is our own mental experience; if our attention is too strongly focussed on it, it ceases; if we begin to observe the nature of our fear, for example, we forget to be afraid. This getting away and watching ourselves is a difficult art, perhaps not to be acquired by all. Yet if a permanent interest in psychological processes has been established, the observer tends to develop a habit of taking fleeting glances at his own mental processes without throwing his mind off the rails. The process has, so to speak, a momentum of its own, which carries it on during the inappreciable fraction of a second during which the observer takes the introspective attitude.

The less the mind is absorbed in its object the easier introspection ought to be. We must avoid the common error of supposing that the whole force of the mind is engaged in every mental process. It is certainly possible to carry on the process of observing a calm non-engrossing mental activity along with the activity itself, without destroying the activity.

The point we insist on is that, while observation of the mind is beset with special difficulties, these difficulties can be overcome by training and practice. This is, after all, no peculiarity of introspection. We can all

observe enough of our minds to make certain simple and obvious distinctions—*e.g.*, between thinking, feeling, and willing. So, when looking at the star-lit sky at night, we can all see enough to distinguish between, say, planets and fixed stars. But the multitudinous observations on which modern theories of the solar system and the stellar universe are based could have been accumulated, as they have been, only by the efforts of generations of trained workers. The individual observer acquires skill through the accumulated results of a series of trials, however unsuccessful he may have been at first; and in the process he derives immense help from the work of his predecessors, from whom he learns what to look for and where to look for it. The same may be said of psychological observation.

The student has a mind—if we may so put it—constantly at hand, and he cannot too soon accustom himself to "look within" in order to test and amplify the statements made in this book.

On the aim and method of Psychology, see James, *Principles of Psychology*, vol. i. ch. vii.; Höffding, *Outlines of Psychology*, ch. i.; Stout, *Manual of Psychology*, 3rd ed., Introd. ch. i., ii.; McDougall, *Outline of Psychology*, ch. i.

A complete definition of the scope and subject-matter of Psychology would carry us beyond the limits of the science itself, and would raise questions belonging to Epistemology or the philosophical Theory of Knowledge. See Ward, "The Definition of Psychology," in *The British Journal of Psychology*, vol. i. no. 1; or the same writer's *Psychological Principles*, Cambridge, 1920, ch. i. and chap. ii. § 1.

We add a few historical notes and references showing ways in which psychologists have dealt with the theoretical and practical difficulties of introspective observation.

A general objection to the scientific value of introspection was made by Auguste Comte in his *Cours de Philosophie Positive* (see especially Preface to fifth ed.), and adopted and

carried farther by James (*Principles*, vol. i. pp. 185-192; cf. *Text-Book of Psychology*, p. 467). Comte's argument may be summed up thus: it is never possible for the mind to do work and at the same time attend to the mental process. J. S. Mill (*Essay on Comte and Positivism*) replied that a process may at any rate be studied through the medium of *memory*, and that our best knowledge of mental processes is acquired thus; we reflect on the process, when it is past, but when the impression on the memory is still fresh. This is quite true; but some writers have carried Mill's view to the extreme point and say that the mental state observed is *always* past before the psychologist can begin to observe it, and that we can have introspection *only* through memory. "A post-mortem is the only possible examination of mental states," says Professor James. Taken strictly, this is an extravagant paradox. It implies that in what we call "now," in that focus of experience which is not the abstraction of a mathematical point or indivisible moment but is the actually existing present, we have no kind of direct hold on our *present mental existence*; we only remember that we existed immediately before. Against this it must be maintained that we could not think of the immediately previous existence of any process unless we had a direct hold on something with which its *previous* existence is contrasted; and this something is simply its *present* existence. Carried to its legitimate conclusion, the argument criticised would show that every perception of a process (in the mind or in the outer world) is not direct, but is only possible through memory. But it is never true that the process to be observed must be past *before we begin* to observe it; it *may* be past before our observation is *completed*. George Henry Lewes (*Study of Psychology*, p. 86) compared the observation of a process of mind and the observation of a moving body: "The movement we observe is really effected before our observation is completed. It was a series of successive positions in space; we re-travel through that series ideally, connecting the point of arrival with the point of departure. It is because we recall these points that we know there has been a movement. It is thus also with the movements of thought. The part of pure observation, or *direct beholding*

is the same in both; and in both it has to be completed by reflection, *indirect beholding*, which re-forms the particulars into a whole." What is here called "indirect beholding" is really the element of memory in perception; but *this memory is not the whole of the process*, which involves a "direct beholding" as well. All introspection *involves* retrospection.

The fundamental position of introspection in Psychology is now generally admitted. Thus, Professor E. B. Titchener, in his systematic work on *Experimental Psychology* (see below, ch. ii. § 7), points out that "no piece of true introspection is too trivial to speak of," and that "a psychological experiment consists of an introspection or a series of introspections made under standard conditions." To the same effect Professor C. S. Myers (*Experimental Psychology*, vol. i. p. 3), after dwelling on the difficulties of introspection and accepting the view that all introspection is fundamentally retrospection, proceeds to point out that "with increasing practice, the attention can be trained to oscillate rapidly to and fro, the subject now responding to experimental conditions, now observing the nature of his consciousness during response; just as with practice he can successfully dictate a letter and read a book, to all appearances simultaneously." The student may also be referred to Professor G. F. Stout's *Manual of Psychology*, 3rd ed., p. 40; *Groundwork of Psychology*, p. 13; and *Analytic Psychology*, vol. i. pp. 44-46.

A remarkable development of the doctrine that introspection, in reference to mental processes, is either impossible or scientifically worthless, is to be seen in America in the work of a group of writers who advocate what they call "Behaviourism," *i.e.*, an exposition of "Psychology" without any reference to mind or consciousness. They borrow the psychological label for misnaming valuable physiological research (see ch. ii. § 7 below).

§ 3. *Laws of Nature.*—In the intellectual type of man the great generalisations of science give rise to feelings of the most profound satisfaction. Lord Balfour, referring to the modern scientific conception of matter, has observed: "Whether the main outlines of the world-

picture which I have just imperfectly presented to you be destined to survive, or whether in their turn they are to be obliterated by some new drawing on the scientific palimpsest, all will, I think, admit that so bold an attempt to unify physical nature excites feelings of the most acute intellectual gratification. The satisfaction it gives is almost æsthetic in its intensity and quality. We feel the same sort of pleasurable shock as when from the crest of some melancholy pass we first see, far below us, the sudden glories of plain, river, and mountain."[1]

But in most people it is the practical value of these generalisations that arouses respect and wonder. For the work of science makes us to some extent masters of the future: it enables us to predict what shall happen, even in many cases to arrange what shall happen. The rigid association between cause and effect assumed by science and strengthened by every successful prediction of the future gives rise to the conception of a mechanistic or determined universe. No other universe is intelligible to the man of science as such. As a scientist the psychologist adopts the assumption, but so complicated are the conditions in his sphere of work that the validity of the assumption is far from proved. Determinism is most strongly entrenched in the sciences which deal with non-living matter, where time and again the hypothesis has been found to hold; in sciences which deal with living organisms, particularly in the sciences of physiology and psychology, there are large regions wherein the deterministic hypothesis appears to break down. Many authorities maintain that these breakdowns are only apparent: they are products of our

[1] "Reflections suggested by the New Theory of Matter": Inaugural Address by the Rt. Hon. Arthur Balfour, President of the British Association, Cambridge, August 1904.

ignorance and imperfect methods of observation. A further discussion of this question will be found in Chapter iii. Meantime, the point to be noted is that the psychologist as a scientist is bound to accept determinism as a hypothesis, and push it as far as it will go. This is because psychology belongs to the group of natural sciences—the sciences which present us with such great generalisations as the Law of Gravitation. Whether determinism is competent as an ultimate principle in human life is a question not so much for the psychologist as for the philosopher, who has to test the principles of all the sciences and bring them into harmony with one another.

We must bear in mind that a *Law of Nature*, when its real meaning is stated, does not tell us absolutely that anything must happen; it tells us that if certain things are done, then certain other things will follow. The real laws of nature are laws with an "if"; in the language of logic, they are "hypothetical propositions," and they do not themselves provide the occasion of their own operation. So far as man has succeeded in understanding this Universe, he has done it by tracing such laws, which form the "order of nature." This definition of natural law is evidently involved in all experimental science.

§ 4. *Normative Sciences.*—Besides the Natural Sciences, there is another group known as Normative or Regulative Sciences, of which the chief are Logic, Ethics, and Æsthetics. These sciences all refer to human life; the laws which they seek to establish are very different from the laws of nature; they are not generalisations descriptive of what is; they are precepts indicating what ought to be. They present to us ideals of correct thinking, of right conduct, of beauty, in accordance with which we are told we ought to live. But these laws we

can and often do break. These sciences then do not accept the deterministic hypothesis of the natural sciences. The word "ought" employed by all of them carries with it the implication that man is a *vera causa*, a true cause; that is, that he can determine what is as yet undetermined. In his synthesis of the sciences the philosopher must not leave these out of account.

CHAPTER II.

DIFFERENT BRANCHES OF PSYCHOLOGY.

§ 1. *Analytic Psychology: Introspection.*—In the previous chapter we have reviewed the central task of Psychology, namely, the description in general terms of the structure and modes of operation of the normal human mind, based on introspective examination of conscious processes. In the words of Professor W. McDougall, "the study of the normal human adult, which, until the modern period, was the only branch of psychology seriously pursued, must always hold its place as in some sense the most important; for its work is to deliver the frontal attack upon the central fortress."[1] No psychologist, however, has limited his procedure to introspection alone. It has always been supplemented (i) by investigation of the products of mental activity, in order to infer from those products what were the processes that produced them; and (ii) by experiment, which is simply the employment of introspection under test conditions.

We have already seen that self-observation and observation of other minds are two processes which supplement each other and react on each other. They have done so in the growth of the mind from infancy, and in the development of mind in the race; and in psychological introspection they must do so still. All psychological reference to other minds, strictly speaking,

[1] *Psychology*, Home University Library, 1920, p. 136.

comes under the head of "observation of the products of mental activity in order to infer from these products the mental processes that produced them"; for it involves observation of the words and actions of others, and inference (in the light of our own conscious experience) as to the mental processes underlying these actions. And this field of indirect or inferential observation may be much further extended.

Thus, a language, a code of law or morals, a system of religious belief, a savage dance, a Gothic cathedral, a poem, a child's drawing, the verses of a maniac, a game of skill or of chance, a Trades Union, a system of government,—these, as well as all other products of human activity, are capable of being studied from the psychological point of view.

When psychology is treated thus, and founded mainly on introspection and on such additional means of helping and verifying introspection, we have what is called *Analytic Psychology.*

The field of inference from mental product to mental process has, however, been extended very much further than has yet been indicated, and has given rise to new investigations, which have practically become distinct branches of the subject. When the first edition of this book was published in 1907, this fact was emphasised, and it was observed that these lines of inquiry could no longer be described merely as different "methods" supplementary to introspection. During the last twenty years this process of specialisation in psychology has rapidly increased. On this account it is no more possible to write a book on psychology as a whole than to write one on mathematics as a whole.

We must, however, briefly indicate the general character of these special branches of the subject. With what follows, the student should compare the statements made in Professor McDougall's *Psychology* in the Home University Library, chapters iv, v, vi, vii, and viii.

We have used the term Analysis as equivalent to introspection or self-observation. This meaning is, of course, entirely different from what in popular usage is called "morbid introspection," ranging from the "self-consciousness" which merely means excessive pre-occupation with one's own person or performances, to a dangerously self-centred absorption in one's own mental condition. Scientific introspection or mental analysis implies a sustained interest in the mind and its operations, not from the point of view of self, but in order to gain general and systematic knowledge of mental operations.[1]

§ 2. *Continuity as a fact of introspective observation.* —When we look back on our previous states of mind, they come before us as a series of ideas and feelings with no distinct links of connection, like a stream where, on looking up it, we see clearly only the crests of the successive waves. In mental experience it may often seem, to memory, as though the stream were composed of separate units simply following one another.

In consequence of this apparent independence of the successive states of consciousness, some psychologists have described the mind as a mere succession of ideas without inner bond and connection. Mental advance was taken to consist, at bottom, in the combination and re-combination of various elementary units (the sensations and primitive movements). The fact is that every part of our mental experience is part of a larger whole; it is not separated from other parts of the whole by something which is non-mental, as one island

[1] A special and highly technical use of the word Analysis, with reference to the mind, has grown up in recent years in connection with the theories advocated by Professor Sigmund Freud of Vienna. This use of the term is referred to below.

is separated from another by the intervening sea, or one note in a melody from the next by an interval of silence. Conscious life is realised in a continuous series of prominent[1] or influential states connected by transitional states which are less prominent.

These relations that lead from one distinct process to another are themselves processes of consciousness; but in realising them, consciousness moves so quickly that *in introspection* they may be overlooked. They are like flights to a conclusion; if we try to look at them in the act of moving, "the rush of the thought is so headlong that it almost always brings us up at the conclusion before we can arrest it; whilst if we wait until the conclusion be reached, it so exceeds them in vigour and stability that it quite eclipses and swallows them up in its glare."[2] If, for instance, some one says to us, "wait for me," or "look at this," or "listen to that," the little words "for," "at," "to," express actual and complex mental processes which are very difficult to analyse introspectively, because the mind rushes so quickly between the processes represented by the two chief words in the sentence.

We must postulate this *continuity* in mental life during the whole of its duration. "At any one moment," says Professor James Ward, "we have a field of consciousness psychologically one and continuous; at the next, we have not a new field but a partial change within this field."

It may be asked, what is to be thought of the apparent interruptions of mental continuity during sleep and in so-called unconscious states? The answer is, that we do not know enough about these states to

[1] "Prominent" from the introspective point of view.
[2] James, *Principles*, vol. i. pp. 243, 244.

dogmatise and say that they are real breaches of continuity. They are certainly interruptions of intense or vivid *conscious* life; but since we do know that these intervals are bridged somehow in reproduction and recognition of past experiences, we are justified in saying that there is a real bond of connection which still survives even in what we call unconsciousness. Thus, something reminds me that fifty years ago, in early childhood, I was very much frightened under certain circumstances. I recall the circumstances (though not in great detail), the feelings they called forth in me, and the actions that followed. This is a typical case of the reproduction of a past experience, and the recognition of it as mine. Such facts imply an inner continuity to which the material world affords no parallel.

In some abnormal states of mind, as in cases of what are called alternations of personality, we seem to have one series of mental processes entirely suspended for a while, and its place taken by another which is as different from the former as if they had belonged to two different minds inhabiting different bodies. And the former series may be resumed after the interruption as if the latter had never existed, and the latter again may be resumed as though the former had never existed. Yet even here we find indications that the breach of continuity is not fundamental and absolute.[1]

The theory that mental advance consists in the combination and re-combination of elementary units, rests at bottom on an error of observation. But it is an error which led to an important system of psychological doctrine known

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[1] One of the most remarkable recent cases is described below (ch. xv. § 5), that of "Sally Beauchamp."

as "Associationism." Distinct processes were taken separate ones; and the mind became a "manifold" elements called "sensations" (including sensations o movement). An interesting version of this theory was worked out by John Stuart Mill in his *Logic* (bk. vi., ch. iv.). He regarded mental development as analogous to a process of chemical combination, the ultimate units being analogous to chemical "atoms." From another point of view, Mill himself forcibly explained the insuperable difficulties which result from the conception of mind as "nothing but a series of states" (*Examination of Hamilton's Philosophy*, ch. xiii).

The theory of mental development exemplified in the English "Associationist" school was set forth by David Hume, *Treatise of Human Nature*, ed. by Green and Grose, 2 vols.; ed. by Selby-Bigge, 1 vol.; James Mill, *Analysis of the Phenomena of the Human Mind*, ed. by J. S. Mill, Bain, and Findlater, 2 vols.; Bain, *The Emotions and the Will* and *The Senses and the Intellect*. On Bain's Associationism, see especially Stout's *Analytic Psychology*, vol. ii., ch. vi. § 2 ("Relative Suggestion"). Bain's work, however, is not only of historic interest, but is still valuable to the student of present-day psychology.

It is remarkable that although Bain was fundamentally a powerful exponent of psychological Associationism, he used expressions which suggest the opposite extreme view, making the transitional or relational processes everything, denying any intrinsic character to any mental process, and making it only a transition to something else: see for instance his *Mental and Moral Science*, p. 83; also Ward, *Psychological Principles*, ch. iv. § 5, and James, *Principles*, vol. i. p. 237 ff. (that the "stream of thought" is "sensibly continuous"), and vol. ii. p. 9 ff. (on the "relativity of knowledge" and the law of contrast).

This discussion introduces us to a principle which we shall meet again, and which has an important bearing on every detail in psychological science,—that the "prominent" mental states—those which we most easily become aware of—form but the very smallest part of our minds as they really live.

The reaction against mechanistic and atomistic explanations of mental life, and especially against the theory that "sensations" are the elementary units or mental atoms, has recently found a very suggestive expression in Germany among a group of writers who insist that the primary element in mental experience is a *Gestalt* or *form of structure.* A succession of musical notes, for example, or a group of adjacent shades of a colour, may be a simple indivisible experience through the form of what is presented. Experimental evidence can be adduced in favour of this view, which is forcibly expounded and defended by E. Koffka, *The Growth of the Mind* (Eng. tr. by R. M. Ogden, 1925).

§ 3. *Genetic Psychology.*—Our statement of what is meant by psychological *continuity* serves to introduce a subject of the greatest importance.

We assume that the reader is familiar with the idea of Evolution or Development. The former term is more often used of the history of the animal series and man; the latter, of the unfolding of the powers of the individual mind. It is with the latter that we are specially concerned. Development involves change, but the change is of a particular kind. Contrast the process by which the sea wears away a limestone shore, or rivers and wind and weather carve out channels among the rocks; and the process by which a seed becomes a complete plant or shrub or tree. The first is a typical instance of mechanical alteration, the mere redistribution of material into new combinations; the second is a case of organic growth. In both cases there is the continual appearance of new characteristics; but in the germination and growth of the seed there is no mere re-arrangement of material. Such notions are inadequate to express the intimacy of the connection between old and new in *growth*; for here the

old activity *affects* the new so closely that it has become customary to speak of the later qualities as evolving (developing, or growing) *from* or *out of* the earlier ones. But the scientific value of this statement depends upon what is meant by "from" or "out of." When we speak of mind being evolved or developed, and use our words with scientific accuracy, what we mean is this. Between the highest development of a mind and its first dim awakening, there is no crossing of a boundary into an entirely different kind of being. Evolution consists in the continual emergence of qualities which are not only apparently but really *new*; there is, however, no point at which we can say, here a new quality appears *entirely unconnected* with anything that has gone before. It is connected with it in the intimacy of living growth. Hence when we speak of the mind as a living thing which grows, which has an environment, and so forth we are employing ideas which actually express far more of the truth about the mind than if we employed ideas borrowed from Physics or Chemistry.

Now there is a perfectly clear and very important question which may be asked concerning the development of the normal mind. What is the order in which the successive phases of mental process appear, as the mind progresses from its first beginning to maturity? To make the meaning of this question clear, we take some of the most prominent phases of mental life—*e.g.*, *perceptions* of one's own body and of objects in the outer world in space and time; distinct *memories* of the past; the beginnings of free *imagination*; the beginnings of abstract *thought*; deliberate *volition*; the consciousness of *one's self* as a separate person, with character, dispositions, and desires of one's own. Now,

in order that perception may be able to develop, as we shall see, certain simpler processes must have preceded; in order that memory and imagination may be possible, the capacity of perception must have been first acquired. It is possible to work out, in detail, connections of this kind; and when this question, of *order of development* in mind, is made prominent, we have what is called *Genetic Psychology*. Genetic and Analytic Psychology are closely connected—indeed, the former would be impossible without the latter: in order that we may ascertain the order in which the successive forms of feeling, thinking, and willing successively emerge (the question of Genetic Psychology), we must know what these forms are (the question of Analytic Psychology).

Professor G. F. Stout's *Analytic Psychology* concentrates on this special aspect of the subject, and is very valuable from the philosophical point of view. But the same writer, in his other books, and most modern writers on General Psychology, combine the analytic and genetic modes of treatment. In illustration of this statement we may refer in particular to the works of Ward, Stout, and McDougall, referred to in ch. i. § 2 above; and also to Baldwin, *Mental Development in the Child and the Race* and *Social and Ethical Interpretations in Mental Development*.

A comprehensive statement of the body of doctrine in General Psychology, which we may say had found general acceptance at the beginning of the present century, was given by Prof. F. Jodl in his *Lehrbuch der Psychologie*, a work which deserves to be better known. A feature of it (rare in German works) is the frequent reference to the writings of English and American psychologists, and the adoption of many of the special terms and conceptions which we have become familiar with in our own language.

Our understanding of mental development is greatly assisted when we think of mental processes as forming

a hierarchical system in which different *levels* can be distinguished. In addition to being psychologically suggestive, this view has sound physiological foundations.[1] A process at a higher level, in a manner, unifies and controls processes at a lower level, although the latter may exist and act before the former has developed.

A convenient illustration is found in the different levels of mental activity by which *knowledge* is acquired. We begin with the acquisition of knowledge by means of the senses, when some object stimulates an afferent sensory nerve. The mental process which immediately follows on this nerve-process is a *sensation*, and is typified in the experience of comparatively simple qualities such as "blue," "hot," "sweet," &c. (ch. ix.). Comparative psychology shows that animals may have the capacity of experiencing (and acting on) sensations without being able to unite them in the perception of an object having different qualities,—a "thing" (ch. xi.). The perception of objects, as real things, is a process at a higher level. When the level of perception is attained, the next step is the development of memory or "reproductive imagination," consisting of memory-images or "free ideas" of past perceptions (ch. xii.). Only "perceptions of things" give rise to these memory-images; there are no distinct memory-images of isolated sensations. The next level shows two branches: (*a*) "productive imagination," or imagination in the ordinary sense, where we make new combinations of mental imagery, representing objects that have never come before our perceptual experience (ch. xiii.); (*b*) "conception," or *thought* proper, of

[1] See McDougall, *Physiological Psychology* (J. M. Dent & Co., "Encyclopædic Primers").

which the distinctive mark is the formation and use of the two primary and fundamental "parts of speech," the *noun* and the *verb* (ch. xiv. § 4).

§ 4. *Child Psychology.*—No one can doubt that a true *psychology of childhood* would throw light on many of the most obscure regions of general psychology. Mental processes, such as Sensation, Perception, Imagination, &c., do not suddenly spring into existence in the form which is theirs when we come to study them in the adult. On the contrary they have a long period of development, germinating in infancy and only very gradually attaining maturity. The problems of the genesis of mental process in the individual are among the chief problems of child psychology. A second set of problems is presented by the rival claims of heredity and environment. What is the congenital endowment of the child, and how far can that endowment be impoverished or enriched by the action of the environment? Is every child equipped with tendencies to act in certain specific ways in response to certain situations? In a word, are there human instincts? What is the nature of intelligence? How soon does it manifest itself? What is its relation to instinct? Is man's moral nature founded on innate tendencies, or is it exclusively a product of the cultural environment? Are moral imbeciles—the existence of whom is recognised by Act of Parliament—the product of a faulty education or the victims of a defective innate equipment? A third set of problems concern themselves with the learning process. What are the chief modes of learning? How far and in what ways does the age of the child affect material for learning and method of presentation? Problems of special importance, the solution of which is not yet in sight, concern

themselves with the development of sex tendencies and social tendencies.

The years of immaturity with which child psychology deals may be divided into the following periods: (1) the period of infancy, from birth or before it to about twelve or eighteen months; (2) the period of babyhood, extending to about three or three and a half years; (3) the period of early childhood, extending to about seven years of age; (4) the period of childhood, extending to about twelve years; (5) the period of adolescence, extending to twenty years of age or later. To psychologists the earliest of these periods are the most important as they are also the most difficult to study.

The methods of observation and experiment applicable in animal psychology are also of great value in child psychology. The method of direct introspection can obviously be employed only in the later periods, and its dicta, owing to the suggestibility of children and their unscientific attitude, must be received with great caution. What may be called reminiscent introspection, that is, the calling up into our minds in later years the experiences of childhood, has considerable value, though one must always be alive to the dangers of memory falsification and adult sophistication. By the method of free association, that is, by putting oneself into a passive frame of mind and allowing memories to come up automatically, the psycho-analysts claim that any individual can reconstruct his own past right back to the very early years of life. There is an interesting and impressive consensus among them with regard to the nature of infantile experience, but their views have not yet been fully accepted by psychologists in general, their evidence for the most part being drawn from people who have shown themselves more or less abnormal. There is,

however, much reason to think that the method is a good method if in capable hands. The method of standardised tests, notably tests of intelligence as initiated by Binet and developed by Terman and others, has put into our hands an instrument of remarkable value for the study of any particular child, and has also made a valuable contribution to our general knowledge of childhood.

On this subject we may refer to: Perez, *First Three Years of Childhood* (tr. from the French); Preyer, *The Mind of the Child* (tr. from the German), most elaborate and comprehensive; Shinn, *Notes on the Development of a Child*, a pioneer work of great value, giving a very detailed account of a child's behaviour up to about three years of age; Sully, *Studies of Childhood*, a popular and very fascinating series of papers; Baldwin, *Mental Development in the Child and the Race*; W. B. Drummond, *The Child: his Nature and Nurture* and *An Introduction to Child Study*; Margaret Drummond, *The Dawn of Mind*; *Five Years Old or Thereabouts*; and *Some Contributions to Child Psychology*; Norsworthy and Whitley, *Psychology of Childhood*; Koffka, *The Growth of the Mind*, an important work based on original investigation (see above, § 2, p. 20); Stern, *The Psychology of Early Childhood*, a comprehensive volume based on study of his own three children; Rasmussen, *Child Psychology* (also a study of the author's own children); *The Child: His Nature and His Needs*, a survey dealing with modern methods of education as well as with the psychology of childhood, ed. by M. V. O'Shea.

The views of the psycho-analytical school are set forth by Lay, *The Child's Unconscious Mind*; Constance Long, *Psychology of Phantasy*; Jung, *Collected Papers on Analytical Psychology*; Freud, *Introductory Lectures on Psycho-Analysis*; Ferenczi, *Contributions to Psycho-Analysis*.

On the Psychology of Learning, see Thorndike, *Educational Psychology*; Freeman, *The Psychology of the Common Branches*, and other works; Drummond, *The Psychology and Teaching of Number*; Smith, *The Reading Process*;

Huey, *Psychology and Pedagogy of Reading.* On the measurement of Intelligence, see Binet, *Mentally Defective Children*, which gives an account of his early work on the subject; Terman, *Measurement of Intelligence* and *The Intelligence of School Children;* Burt, *Mental and Scholastic Tests;* Ballard, *Mental Tests* and *Group Tests of Intelligence;* the Board of Education (London) Report on *Psychological Tests of Educable Capacity*, which includes a valuable historical sketch of the development of psychological tests. See also § 8, below.

On the psychology of the delinquent child, a special field of great theoretical as well as practical interest, see Healy, *The Individual Delinquent; Conflict and Misconduct;* and other works; and Burt, *The Young Delinquent.*

§ 5. *Animal Psychology.*—The development of mind through the series of forms of animal life up to man has been studied with increasing thoroughness as the influence of the doctrine of Evolution has increased since the middle of the nineteenth century. The study of *Animal Psychology* is sometimes called *Comparative Psychology*: a term which is used because the investigation involves a comparison of the developed mind of man with the lower manifestations of animal life, and also of these with one another. On the basis of careful observations we may form an idea of what the development of mind has been through the history of the animal races up to the beginning of the human race.

In such inquiries there is always the possibility of a most serious error being made. We may misinterpret the facts by assimilating them too much to our own experience.[1] Thus, we may attribute to the mind of

[1] It will be seen, on consideration, that this mistake besets psychologists in every case where the interpretation of another mind is at issue. Professor James called it "*the* psychologist's fallacy" (cp. his *Principles*, vol. i. pp. 196-7.)

the animal a much higher degree of intelligence than really belongs to it. We may suppose, for instance, that the gesture or action expresses the same mental process in the animal's experience as it would for a being of our own mental level.

Mental activities are so complex and multifarious that practically every kind of behaviour is capable of more than one interpretation. There is only one safe maxim: in the case of animal behaviour, we should always have recourse to the simplest explanation possible—*e.g.*, attribute the act to simple association of ideas rather than to logical reasoning, or to simple memory rather than to constructive imagination. It is a consequence of the known principles of evolution that if the simpler mental process is sufficient for the creature to meet its needs, the higher process will not be developed.

On the other hand, this assumption must not be carried too far. For example, Thorndike's celebrated tests on cats are often quoted in support of mechanistic theories of animal behaviour. The creature had to solve a mechanical problem in order to free itself and obtain food. The first solution was hit upon by chance; but repetition brought facility, and eventually it "learnt" the way out. It was concluded from this that chance movements which led to successful results were linked together into "chained reflexes," and that this was the true type of animal behaviour, and—it was provisionally assumed—of human behaviour also. More recently the experiments of Köhler and others have revealed modes of animal behaviour which cannot be explained in terms of a chance concatenation of movements. In particular, the investigations of Köhler strongly support the assertion that chimpanzees are able to overcome mechanical difficulties by an "insight" into the situation. In other

words, they are able in some sense to appreciate the relations between parts of the situation and their significance for the whole.

For details of these experiments see *The Mentality of Apes*, by Wolfgang Köhler (compare also *Frequency and Recency Factors in Maze-learning by White Rats*, J. Peterson, "Journal of Animal Behaviour," 1917); Thorndike, *Animal Intelligence*; Hobhouse, *Mind in Evolution*; Lloyd Morgan, *Animal Behaviour*.

A good general survey of the subject will be found in Wundt, *Human and Animal Psychology* (tr. from the German).

§ 6. *Social Psychology.*—We cannot begin to understand the development of the normal human mind unless we recognise the influence of the *social factor* in that development. Human life from the beginning has been social life; and Society develops powers beyond those of the individuals composing it, by which the development of the individuals is deeply influenced.

This fact has given rise to a number of closely related inquiries and studies, most of which involve psychological questions. They fall naturally into two groups. Anthropology investigates the total life of primitive man,—savage beliefs, superstitions, religions, languages, laws, art, &c., all of which are mental products, and have much to tell us of the tribal or national mind which produced them. When we pass to more civilised peoples, the study is called Sociology instead of Anthropology; and the same result holds good, for social institutions, customs, and traditions, are genuine indications of mental life.

The psychological aspects of these subjects are so important that they have led to the formation of a special study, usually called Social Psychology, lying

between Sociology on the one hand and normal General Psychology (§§ 1, 3, above) on the other hand. Its object is "to provide a science of man in his social relationships, by studying the elements in normal adult psychology which affect the formation of social groups and the interactions between individuals in such groups."[1]

It may fairly be said that Professor W. McDougall's *Social Psychology* (1st ed. 1908, 16th ed. 1921) is one of the most important books issued on this subject for many years; not because its conclusions are universally accepted, but because of its stimulating effect on other special students of the subject and its influence on a whole generation of students of education. The most important discussions springing from McDougall's theories have their centre in his account of human Instincts, their innate forms, modifications and transformations, and scientific classification (see below, ch. vii. §§ 3-6).

The chief psychological aspects of Anthropology and Sociology are studied by F. C. Bartlett, *Psychology and Primitive Culture;* and Lévy-Bruhl, *Les Fonctions Mentales dans les Sociétés Inférieures* (in which Bartlett emphasises the similarity, and Lévy-Bruhl the difference, between primitive mentality and our own); R. R. Marett, *Psychology and Folklore;* W. McDougall, *The Group Mind;* R. M. M'Iver, *Community;* W. H. R. Rivers, *Psychology and Politics* (posthumously published Essays, with an Appreciation by C. S. Myers).

The Psychology of Religion has become a special department of the subject, closely connected both with Social and Individual Psychology. It is concerned with Religions, not as true or false, but as forms of social and personal experience. The field of study is illustrated by R. R. Marett, *The Threshold of Religion;* R. H. Thouless, *Introduction to*

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[1] R. H. Thouless, *Social Psychology*, London, 1925 (a useful introduction to the subject, emphasising those parts of psychology which have the most important bearing on economic and sociological questions).

the Psychology of Religion; J. B. Pratt, *The Religious Consciousness;* R. H. Lowie, *Primitive Religion.*

§ 7. *Experimental Psychology: "Behaviourism."*—In *experiment,* we are not content to take the facts as we find them; we interfere with them and arrange them for ourselves, in order to see what will happen. An experiment is thus "a question asked of Nature."

The possibilities of experimental work have been actively exploited during the last half-century in every field of the province of psychology. Illustrations of the value of such work are given in the chapters which follow. Many ingenious methods of experiment and many useful pieces of apparatus have been devised; and since the conduct of experiments which involve the use of apparatus of any complexity demands a properly equipped laboratory, there has grown up within the field of experimental psychology a more specialised field of laboratory psychology, which owing to practical necessities has come to be regarded as a separate department. It is, however, only an elaboration and refinement of the fundamental method of observation described above (ch. i. § 2). For this reason, as Professor McDougall observes, "experimental observation and laboratory methods are most extensively employed in the psychology of normal human adults: . . . for only in such subjects can we hope to find the necessary patience and scientific conscience, and only from them can we hope to obtain uniformly trustworthy, introspective reports."[1] But, as the same writer clearly points out, experiment may be, and is, applied in animal psychology and other departments of the subject where there is no possibility of introspective reports. Mind as we know it is always

[1] *Psychology,* Home University Library, p. 128.

embodied mind: all conscious states in experience are connected with a body or material organism. In fact, whatever opinion we may hold as to the real connection between the mind itself and the bodily organism, there is no doubt that only by means of the body can the mind become acquainted with its surroundings and communicate with other minds.[1] Mental life must show its existence to other beings by means of a body, and in particular by means of a nervous system. In this sense we may say that the manifestations of mind—observe we do not say "mind," but the "manifestations of mind"—depend entirely on bodily conditions. This is specially evident in two ways: we are dependent on the sense-organs for our acquaintance with the outer world, and on the muscular organs for our power to act on the outer world. Sensation and Movement are thus intimately dependent on the body. These are, in a sense, the two ends of mental life, corresponding to incoming and outgoing nerve-currents. These two departments of mental life may therefore be studied to great advantage in connection with the physiological facts on which they depend. This is much more difficult in the case of the higher intellectual processes; for, although the whole analogy of science (as we shall see) goes to prove that for every change in the activity of the mind there is a change of motion in the brain, still, the physiology of the brain is not sufficiently advanced to throw much

[1] It is possible that there are exceptions to this statement, and that the alleged phenomena of "thought-transference" and "clairvoyance" do really indicate the possibility of a communication between mind and mind by means other than the ordinary channels of sense. But the nature of those means is so little understood that we are compelled to leave them out of our account.

light upon the psychology of the comparatively complex mental processes. But in the simpler phenomena of sensation and movement, physiology is of great assistance. For this reason there has grown up in recent years yet another distinct branch of study, known as Physiological Psychology, and often treated as a separate department of the subject: the study of the facts of mind in immediate connection with their bodily conditions. The term Physiological Psychology usually includes lines of inquiry which, though they take account of the presence of mental states, are purely physiological: such are investigation of the variations in the circulation of the blood, in the temperature of the brain, in respiration, in muscular and glandular activity, which accompany various kinds of mental activity; and, again, investigation of the question, what parts of the brain are specially active when a particular mental process is going on?

Some writers on Physiological Psychology cannot be acquitted of a bias towards making the physiological process the reality, and the mental process an unsubstantial accompaniment of it—an "epiphenomenon" of it, to use a term which has been bandied about in these disputes. Most usually this bias betrays itself in the general statement that, from the scientific point of view, the final explanation of mental processes is to be found in physical processes, and in particular, that we have explained a mental change when we have ascertained the brain-change which it accompanies. This position we repudiate as inconsistent with present knowledge; but we shall freely use physiological *illustrations* of psychological principles, for they are often very suggestive.

On the general question of how far a physiological connection of brain-processes can explain a psychological

connection of mental processes, the student should consult Stout's *Analytic Psychology*, vol. i. pp. 28-34. Fundamentally this question raises the whole problem of the relation of mind and body; and the most important present aspects of this problem are dealt with in the following chapter.

In the field of experimental and physiological psychology, the most important pioneer workers in the nineteenth century were Weber, Fechner, Lotze, and (above all) W. Wundt. The work done in the Psychological Laboratory which Wundt founded in the University of Leipzig, and his great treatise, *Physiologische Psychologie*, originally published in 1874 (5th ed. 1903), have had immense influence on great numbers of students in Great Britain and America as well as on the continent of Europe. Ebbinghaus, *Grundzüge der Psychologie*, provides an accurate survey of the field, with further valuable researches, and may be regarded as a sequel to Wundt's pioneer work. The chief facts are concisely reviewed by Külpe, *Outlines of Psychology* (tr. from the German).

The range of contemporary work in this field is shown in the following English and American books, which also give full references to foreign work: G. T. Ladd and R. S. Woodworth, *Elements of Physiological Psychology*; E. B. Titchener, *Text Book of Experimental Psychology: a Manual of Laboratory Practice* (four parts); C. S. Myers and F. C. Bartlett, *Text Book of Experimental Psychology* (two vols.); and M. Collins and J. Drever, *Experimental Psychology*.

We referred above (ch. i., § 3, p. 10) to the American writers who advocate "Behaviourism" in Psychology, and we affirmed that they borrow the psychological label and attach it to what is really not psychology at all but valuable physiological investigation. This attempt to construct a "psychology without a mind" is ably represented by Professor J. B. Watson, *Behavior: an Introduction to Comparative Psychology* (1914) and *Psychology from the Standpoint of a Behaviorist* (1919). A critical review of the movement—if such it can be called—is given by A. A. Roback, *Behaviorism and Psychology*, published by Harvard

University in 1922. As presented by Watson, Behaviourism is a theory of the subject-matter and method of psychology. (i) The subject-matter is "behaviour" exclusively, where "behaviour" means "the total muscular and glandular changes which follow upon a given stimulus," whether from outside the body or within it. (ii.) "Behaviour" is scientifically explicable without reference to what are commonly called "mental" processes: "It is possible to write a psychology and never use the terms consciousness, mental states, mind, content, will, imagery, and the like." Now this conception evidently leaves open a field for important experimental research on stimulus and response: but what is it as "psychology"? The critics reply that the behaviourist's *first* proposition can be shown to be false in any test case which is taken (see, for example, papers on the question, "Is thinking merely the action of Language Mechanism?" *British Journal of Psychology*, vol. xi., part i.). The behaviourist's *second* proposition might be true although the first is false: but his position would then approximate to psycho-physical parallelism, and the question would be, what new evidence in support of this theory the behaviourist has adduced. The answer is, that he has adduced no new evidence.

§ 8. *Individual Psychology: Abnormal Psychology.*—We have said that personal peculiarities do not fall within the field of normal psychology: science seeks results that are true not merely in this or that particular case. But mental characteristics which are really personal peculiarities may become objects of a genuine scientific interest, when it is sought to know how far such individual variations extend, and how they arise. A distinct branch of the subject has therefore taken shape, known as *Individual Psychology*, occupied with the investigation of these problems. An early contribution to Individual Psychology was made by Francis Galton in his remarkably interesting and instructive book, *Inquiries into Human Faculty*, dealing

among other things with the different kinds of mental imagery characteristic of different minds.

"Individual Psychology," says Professor McDougall, "is a field for the application of the knowledge and understanding acquired in other departments of the subject; its work is to define the peculiarities of mental constitution which render the behaviour and development of each individual and human being unique."[1] In this field psychology approaches art. But the inquiry becomes more and more scientific with the application of various kinds of *mental test* (cp. § 4 above). This consists in testing the capacity of an individual to execute a definite prescribed task (or of different individuals, when comparison is desired). Galton tested for a *specific mental function*, visual imagery, and he found the most extraordinary variations between individuals (see below, ch. xiii. § 2). Several recent investigators have devised tests for the qualities of mind which are most useful in a particular kind of occupation. The practical importance of such inquiries is evident; and special attention has been given to them by students of "industrial psychology," —the application of psychological results to industrial conditions.

A great deal of attention has been given to the invention and experimental trial of *intelligence tests* for the investigation of "intelligence" understood as "the *general ability* which is supposed to underlie all the particular abilities of an individual."

Reference has been made, in § 4 above, to several authoritative works on the application and use of these tests. There has been some controversy over the question,

[1] *Psychology*, Home University Library, p. 188.

what exactly is meant by "general ability": see *The British Journal of Psychology*, vol. v., 1913, "General Ability: its Existence and Nature," by B. Hart and C. Spearman; vol. vii., 1913, "A Hierarchy without a General Factor," by G. H. Thomson and C. Spearman; and vol. xiv., 1924, papers on "The Nature of General Intelligence and Ability," by G. H. Thomson, E. Claparède, and L. L. Thurstone. See also *Instinct, Intelligence, and Character*, by G. H. Thomson, ch. xx.

Some of the general questions which arise in Individual Psychology are discussed by Ward, *Psychological Principles*, ch. xvii., xviii. The subject embraces a wide field, including the psychology of Temperament; of the chief differences between the Sexes; of the forms of Talent and Genius; of Criminal Characteristics. The question of Temperament and its varieties receives very full analytic and descriptive treatment in C. G. Jung, *Psychological Types* (Eng. tr. 1923).

Cases of mental defect have much instruction to offer for understanding the working of the normal mind; thus, in the case of those born blind, we may study the forms assumed under such conditions by Memory and Imagination. Deaf-mutes,[1] and the possibilities of their education, present many instructive problems; but the case of Helen Keller (a *blind* deaf-mute from her eighteenth month) is unique. She was not only successfully educated, but acquired high proficiency in Classics and Mathematics. Miss Keller's *Story of my Life* is a work of the greatest interest.

When mental defects are so serious as to constitute a real mental disorder, a disease of the mind, the door is opened to another great field of study, which has been called *Abnormal Psychology*. Just as we have

[1] A deaf-mute is one in whom defective hearing (congenital or acquired in early life) hinders or prevents the acquisition of the power of speech.

Physiology describing the normal functions of the human body and Pathology its diseased states, so we have a pathology of mind. But Abnormal Psychology is not only concerned with minds in definitely morbid or pathological states; it is also concerned with the wide field of unusual or abnormal states of mind which cannot fairly be classed as morbid. There is no clearly defined frontier-line on either side. Any state of mind which deviates, to a more or less serious extent, from what is regarded as normal or usual, may be described as "abnormal"; thus, *sleep* and *dreams*, on account of the great difficulty of investigating them, are counted as abnormal states of mind; *hypnotism*—where the will of the subject seems to be laid asleep—and *somnambulism* go somewhat further from the normal; and so we pass on to the more definitely morbid conditions associated with such facts as *delirium*, *delusion*, *hysteria*, *disorders of personality*, and the various forms of *insanity*.[1]

The middle region, lying between the "normal" and the "pathological," is full of suggestiveness and instruction for the student of General Psychology; and it is here that the most fruitful investigations have been carried through in recent years, particularly into the facts of *dissociation* ("hysteria") and *repression*. What do we mean, in this connection, by these terms?

By "dissociation" we mean any kind of division of the mind into two (or more) groups of activities which work independently of one another, or even

[1] A clear view of the outlines of this field is provided by Dr Bernard Hart's small book on *The Psychology of Insanity* (in the series "Cambridge Manuals of Science and Literature") together with Professor McDougall's *Outline of Abnormal Psychology*, London, 1926.

enter into some sort of rivalry, instead of co-operating in normal fashion. Such a statement, however, requires to be supplemented by some reasonable hypothesis suggesting an explanation of the condition. "Such a hypothesis is that of Professor Janet, to whom more than to any other our present knowledge of these states is due. He assumes that the unity of the mind, as normally revealed in the direction of its activity towards one topic at any one moment, depends on the exercise of a synthetic power or energy which is one of the fundamental functions or faculties of mind; and he supposes that, in the patients who exhibit these curious modes of behaviour, this synthetic energy is for some reason defective"[1]; the mind cannot carry on its "unifying function" with normal efficiency, and its activities, instead of being harmonised in one stream which, however broad or deep, is nevertheless a single complex activity, fall apart into two or even more streams, each of which is narrower and (often) more concentrated.

Most of us are familiar with slight changes of this kind, as when we pass from a mood of one dominant emotional tone to a mood of another and perhaps conflicting tone. Imagine such a condition to be intensified and recurrent, and then you have an approach to "alternation of personalities."[2] Or, again, most of us are familiar with the fact that when our attention is absorbed elsewhere we may be slightly hurt without feeling it. This points on to the more intensified "dissociation" where, for example, an arm or hand may be insensitive to pain or other stimulus, while it may be induced to write intelligible answers

[1] Cp. McDougall, *op. cit.*, p. 201.

[2] See ch. xv., below.

to questions whispered in the subject's ear, he being unconscious of either question or answer.

In the remarkable analytical work of Professor Sigmund Freud, of Vienna—which has been the subject of much commendation and much criticism, equally ill-informed—these peculiar conditions of mind are studied from another direction. He claims to show that to the *repression* of instinctive activities in childhood are due the grave neuroses which form such a serious feature of our present-day civilisation. As indicated in the concluding chapter of this book, the human self in its complexity and manifold contradictions fully reflects the complexity and contradictions of the outer world. In his possibilities the child may appear "trailing clouds of glory," but in his actualities he comes with inborn impulses derived from savage ancestors or from the beasts that perish. From these impulses, however, he derives the strength of his life; they must never be destroyed, but, purged and purified by the wisest forces that religion, education, and self-mastery can provide, must be led to rise from the service of the seen and temporal to the service of the unseen which is eternal.

The term "psycho-analysis," when rightly used, signifies a method of treatment by which mental tendencies, which have been repressed and are causing more or less serious mental disturbance by working as it were independently below the level of consciousness, may be so liberated and transformed that their pent-up energy becomes available for the rational purposes of life. The repressed impulse becomes so because of its hostility to the dominant tendencies occupying our conscious nature: it may, for instance, be a temptation which we find shocking, or any other impulse in some

degree unwelcome. This kind of repression is *morbid;* in other words, it does not come through facing the unwelcome impulse, frankly recognising it for what it is, and by reasonable self-mastery conquering it. On the contrary, the thing is pushed as it were out of sight; its repression becomes unconscious.

In conditions of diminished mental concentration, particularly in *dreams*, the repressed tendency finds its chance to express itself, partially and symbolically, as in the course of imagery in a dream, which is often found to express in disguised form the meaning of a repressed tendency or "unconscious wish."

The most important school of psycho-analysis is founded on the investigations and theories of Sigmund Freud of Vienna. Divergent interpretations are represented by C. G. Jung, of Zurich, and A. Adler, of Vienna. In the main they agree in the assumption that *some one or other* of the primary instincts of our nature constitutes the fundamental impetus or driving power of human life, and that the streams of associated mental imagery are the symbols of this mental impetus and the means by which it finds expression. But they do not agree as to what it is. (i.) Freud makes *sexuality* predominant, extending the meaning of this term to include large areas of the life of the child which are remote from the sexual impulse as developed in adult life: see his *Introductory Lectures on Psycho-analysis* (Eng. tr. by Joan Riviere); also *On Dreams* (Eng. tr. by M. D. Eder and Preface by Dr W. L. Mackenzie), which serves as an introduction to the larger work, *The Interpretation of Dreams* (Eng. tr. by A. A. Brill); (ii.) Adler makes the *self-assertive impulse* the most fundamental, but again this term is used in a wider and (so far) a vaguer meaning than that of the developed self-assertive impulse with its characteristic physical signs: see his *Individual Psychology: its Theory and Practice* (Eng. tr. by Dr Paul Radin). Not wholly foreign to Adler's conception is that of W. H. R. Rivers, who finds the

fundamental tendency in *fear*, or, more broadly, in the group of *self-preservative impulses*: see his *Instinct and the Unconscious* and *Conflict and Dream*; (iii.) Jung finds the fundamental impulse to be a life-energy, with the character of free creation continually striving to build up a unified mental life in harmony with environment[1]: see his *Collected Papers on Analytical Psychology* (Eng. tr. by Constance M. Long), and (largely influenced by Jung) Dr Maurice Nicoll's *Dream Psychology*, and Dr William Brown's *Suggestion and Mental Analysis* and *Talks on Psychotherapy*.

A hostile but instructive criticism of psycho-analysis, from the materialistic point of view, will be found in Dr A. Wohlgemuth's *Critical Examination of Psycho-analysis*. For more constructive and sympathetic criticism, see J. T. MacCurdy, *Problems in Dynamic Psychology*; also papers by Dr W. Brown on "Freud's Theory of the Unconscious," and by Prof. T. H. Pear on "The Analysis of some Personal Dreams, with reference to Freud's Theory of Dream Interpretation," both in *The British Journal of Psychology*, vol. vi., pt. 3, Feb. 1914.

For an introduction to the whole subject, see McDougall, *An Outline of Abnormal Psychology;* and, with special reference to mind cure, *Psycho-therapeutics*, by Morton Prince and others, published in 1910 (London: T. Fisher Unwin), and still valuable.

Many "hysterias" in ordinary life, no doubt, arise from suppressed conflicts connected with sex. But the War provided many cases where it was impossible to connect the trouble in any way with sexuality; and *fear* was found to be at the bottom of it; and Adler is probably right in thinking that in many cases where sex is involved it is not the fundamental factor, because a form of the demand for self-assertion underlies the trouble.

We conclude this chapter with two quotations which will repay careful consideration.

"What has psychology done to enable us to benefit our fellow-men? Much might be said in reply to this

[1] This conception is closely akin to the principle on which Bergson's philosophy is built.

question; but the most striking answer would be to point to a number of men and women who, after being for many years a painful burden to themselves and their friends, and after having been subjected without benefit to many forms of medical treatment, have been restored to health and happiness and usefulness by the application of psychological knowledge and psychological theory. This new doctrine and the practice based upon it are of importance not only in the one province of medicine in which they have been worked out; their interest and importance go far beyond those limits. They are leading to a great extension of the psychological attitude towards mental diseases of all kinds; and they are opening vistas of great extensions of our knowledge of the workings of the normal mind; especially they are revealing a realm of unconscious mental activity the existence of which had been vaguely conjectured, but which had remained unexplored and altogether problematical. For both the continued repression of the reprehensible tendencies, and the processes by which they partially evade control, are distinctly purposive activities; and the latter seem to involve in some cases complex and subtle operations. And, if the interpretation of dreams according to this new method is not altogether fanciful, some complex dreams are not, as hitherto generally assumed, merely fortuitous and purposeless streams of pictorial fancies; rather, they are full at every point of significance, are in fact highly elaborated trains of symbolical imagery produced by ingeniously selective and constructive thinking, which, while remaining unconscious, is guided and sustained by a hidden purpose or design."[1]

[1] McDougall, *Psychology* (H.U.L.), p. 210 (for the term "subconscious" we have here substituted "unconscious," see below, ch. iv. § 4).

And the opening sentences of this statement find a fitting commentary in the following, by a former Regius Professor of Medicine in the University of Cambridge: "Spiritual gifts certainly do consist in a re-animation and remodelling of matter in the uppermost strands of the brain, and probably of some other, perhaps even of all the other, molecular activities of the body. Probably no limb, no viscus, is so far a vessel of dishonour as to lie wholly outside the renewals of the spirit: and to an infinite Intelligence every accession of spiritual life would be apparent in a new harmony of each and all of the metabolic streams and confluences of the body."[1]

[1] From a symposium on "Mental Healing," published in *The British Medical Journal*, January 1910.

CHAPTER III.

MIND AND BODY.

EVERY thinker who seeks to make his thoughts of the universe clear and self-consistent is sooner or later driven to inquire: What is the relation between my mind—the living principle which I regard as my inmost self—and this body of mine which seems now my servant, now my master?

A moment's thought will show that the question involves grave issues. To human beings, indeed, it is the most fundamental and vitally interesting of all questions, because of its bearing on our views of human freedom and human immortality. And although we have no wish to awaken the controversies which have raged on these age-long battlefields, yet the interdependence of mind and body, which no one now denies, and which physiological science is every day rendering more and more definite, makes it imperative for psychology to have some clear conception of the nature of the problem and of the solution which would appear satisfactory from her point of view.

The goal here indicated has not yet been reached, for rival theories still hold the field. Accordingly all we can attempt to do is to show the form in which the problem presents itself at the present time, and to

expound as clearly as we can what may be called the living hypotheses of the day.

§ 1. *The scientific conception of "matter" and "energy."*—Our first crude thought starts with mind and body as two entities closely connected with one another but differing in essence, the one being, as we say, spiritual, the other material,—the one in some sense untrammelled by the laws of space and time, the other strictly conditioned by them. The one is a unity—at this stage of thought an indivisible unity,—the other is a complex whole made up of parts. The supposition that mind acts on matter and matter on mind presents no difficulty; it is indeed an obvious fact: at the command of the will the limbs move; when the body is healthy and satisfied the mind is content; when it is starved the spirits droop. These two partners, both equally real, make up the self, but the dominant one is the mind: if pressed, we should without hesitation declare, The mind, not the body, is my true self. Pleasure is even taken in emphasising the superiority and independence of the mind compared with the body:—

> "*The mind is its own place, and in itself*
> *Can make a heaven of hell, a hell of heaven.*"

Still, for obvious reasons, it is the body which thrusts itself mainly on our attention. It appeals to all our senses; it can be examined with comparative ease; most important of all, nature insists that we shall guide it aright or perish. Moreover, it is part of the great space-included world around us, so familiar, so interesting to us all. Here is a permanent order of things in whose stability our thought rests secure: these hills, these trees, these streams, the same yesterday, to-day, and for ever. Shall we not seek to know their nature

and their relations to us and to each other? But when we come to look more closely, the permanence we thought to find is seen to be not in changelessness, but in change. Years come, years go, and nothing remains the same. The eternal hills themselves are worn down to plain and valley.

> "The hills are shadows, and they flow
> From form to form, and nothing stands;
> They melt like mists, the solid lands,
> Like clouds, they shape themselves and go."

Yet in the very midst of this ceaseless flux is to be found the order, the stability which our minds demand. For in the change is no caprice; what happens to-day will, if the same circumstances arise, happen to-morrow. Our task, then, is to discover the rules in accordance with which changes take place; and from this endeavour spring the great generalisations of science. To explain the incoherencies of the world of sense, there has been built up and fitted to it point by point a vast unseen framework which introduces law into the chaos and enables us to predict the future.

It would be interesting to follow the formation of this ideal construction step by step, but that would be to give the whole history of physical science. We must content ourselves with asking, Under what aspect does the universe appear when analysis has done its utmost? Until quite recently the answer would have been as follows. The material world is built up out of about ninety elementary or simple substances, which are themselves changeless in their properties and indestructible; these elements, alone and by "combining" one with another, make up the various substances we know; but no matter how much they appear to be changed by the associations into which they enter, they can always

be recovered and made to show their own original properties. Of late years we have been able to press farther into the intimate nature of matter, and this advance has been the source of the most profound satisfaction to the philosophic mind. For the deepest craving of our intellect is for unity, and to many of us the conception of fundamental differences in the nature of matter was, so to speak, a pinching shoe which made the mind go halt.

Now, thanks to the discovery of radio-activity, and the investigation of the properties of radio-active bodies, it has been shown that every atom is a complex structure built up out of particles which are themselves identical. Our craving for unity is thus satisfied, and we seem at last to have found the primal stuff of which our world is built.

These ultimate particles are electrically charged; and as this charge appears to be their fundamental property, they may be defined as units of electricity. The difference between any two substances, gold and silver, for example, arises solely from different groupings, and different movements of identical particles. If this be so, then the modern electrical theory of matter has not affected the general scientific position. In a lecture delivered at Innsbrück in 1869 by Helmholtz, occurs the following pregnant sentence: "If, then, all elementary substances are unchangeable in respect to their properties, and only changeable as regards their combination and states of aggregation — that is, in respect to their distribution in space—it follows that all changes in the world are changes in the local distribution of elementary matter, and are eventually brought about through Motion."

The substitution of "units of electricity" for elementary substances would in no way affect the argument. It would still follow that all changes in the world are

"changes in the local distribution of elementary matter, and are eventually brought about through Motion." We thus arrive at a mechanical theory of the universe, for motion is essentially a change determined from behind —*i.e.*, determined by some other change preceding it in time. In this conception lies the whole *rationale* of Physics: her business is to find out according to what invariable rule of succession does *this* follow upon *that*.

2. *Application of these principles to the brain.*—Such, then, being our conception of the world of touch and sight, we turn to inquire how it affects the one piece of matter in which as psychologists we are peculiarly interested—namely, the human brain. It was long before man could make up his mind to treat man as in any sense a machine. Even so late as the middle of last century it was often maintained that auscultation and percussion of the organs of the chest were coarse mechanical means of investigation unnecessary to a physician with clear mental insight, and that it debased a human being to treat him like a machine. Philosophers, however, were not so slow to feel the attractions of the mechanical theory as a mode of reducing the universe to unity; and even in the seventeenth century great thinkers were found who seriously maintained that for the animal creation desire and fear, hate and love, do not exist; that their cries may be regarded as a mere creaking of a wheel; that, in a word, all their actions may be explained as we explain the action of a steam engine. Even in the case of man the interference of mind with the bodily machine was minimised as much as possible; and here, accordingly, we find the delightfully quaint notion that in the "pineal gland" at the base of the brain, and there alone, soul and body meet.

In our own day the mechanical theory has come to be applied boldly to the human body with the most remarkable and satisfactory results. A definite part of the *cerebrum* of the brain (the *cortex*[1]) is now recognised as more particularly the seat of mind or consciousness. On the study of the human brain all the resources of science have been brought to bear, with the result that, in the words of one of its most distinguished exponents, it has been shown to be "delicate and complicated beyond our present comprehension." It has been computed that there are in the grey matter of the brain about three thousand millions of cells, and "each of these cells is an active organ of most complicated internal arrangements, so far independent in action, and each has attached to it as part of it 'dendrites' and means of connection with other cells and with the organs of the body." The brain is, as it were, the central office of the body. It regulates its whole nutrition, is the vehicle of sensation, the originator of movement, the instrument of thought. A mind deranged has been proved to indicate brain injury; and most striking fact of all, many of the mental functions have been localised in definite parts of the brain. Areas of the brain concerned with the movements of the arm, the leg, the head, the trunk, have been mapped out. Four sense-centres appropriated respectively to sight, touch, smell, and hearing have been distinguished; between these, and possessed of a peculiar and elaborate nerve structure, are situated the four great thought-centres, or centres of association.[2]

§ 3. *Localisation of brain-function: examples.*—As an

[1] See Glossary of Physiological terms at end of book.

[2] Cf. Flechsig, *Gehirn und Seele* (the passages are referred to also in Professor James's booklet, *Human Immortality*, pp. 20, 21, 89-91).

example of the kind of work which is being done in this localisation of the functions of the brain, let us examine the evidence accumulated by the study of the symptoms embraced under the term Aphasia.

To understand the different forms of Aphasia, a general knowledge of the working of the nervous system is required. The nerves which connect the periphery of the body with the central nervous system (spinal cord and brain) are divided according to their functions into two kinds—sensory and motor. The sensory or afferent nerves transmit stimuli from the various end organs of sense—eye, ear, skin, &c.—to the brain; the motor or efferent nerves convey mandates from the brain to the muscles and glands. Corresponding to this distinction in the nerve fibres, there are in the brain sensory centres and motor centres which respectively receive and project the stimuli which pass along the nerves. The centres are themselves connected, both directly and through "higher" or thought-centres. Persons suffering from Aphasia may be affected in any of the four following ways: 1. They may fail to recognise spoken words as words, though they hear the sound perfectly well. This is word-deafness or Auditory Aphasia. 2. They may fail to recognise written characters as words, though they see them as black marks on white paper. This is word-blindness or Visual Aphasia. These two forms, which both affect messages conveyed by the sensory nerves, are grouped together as Sensory or Receptive Aphasia. 3. Patients may be unable to use words correctly, though they have no difficulty in making the sounds. This is Vocal Aphasia. 4. They may become unable to write words, though they remain able to speak

them. This is Graphic Aphasia or Agraphia. These two latter forms, which affect the work of the motor nerves, are grouped together as Motor Aphasia.

Now each of these forms of Aphasia has been found to be accompanied by, or to be the symptom of, an injury to a definite portion of the brain. Accordingly, in correspondence with the four kinds of Aphasia men-

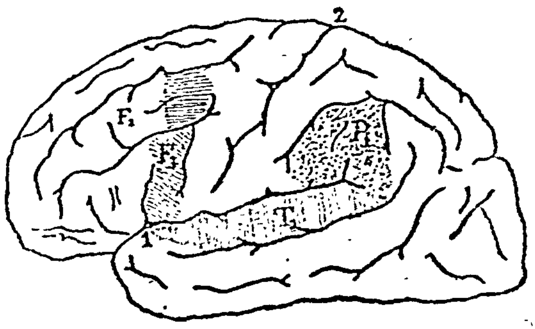

Fig. 1.—Outline of the Left Hemisphere of the Brain.

1. Fissure of Sylvius. 2. Fissure of Rolando. F_2, second frontal convolution; the shaded area shows the position of the graphic speech centre. F_3, third frontal convolution; the shaded area shows the position of the motor-vocal speech centre. T_1, first temporal convolution; the shaded area shows the position of the auditory speech centre. P_1, inferior parietal lobule; the shaded area shows the position of the visual speech centre. (Figure after Bernard, from Dr Byrom Bramwell's lecture on "Aphasia," *The Lancet*, Jan. 13, 1906.)

tioned above, we distinguish in the brain an Auditory Speech Centre, a Visual Speech Centre, a Vocal Speech Centre, and a Graphic Speech Centre. These speech centres normally occur in the left hemisphere of the brain, and their positions are shown in the diagram (fig. 1).

Of these speech centres the auditory and the vocal are the primary pair; the other two may, and sometimes do, remain uneducated through life: from the

point of view of physiology the problem of illiteracy is the problem of uneducated visual and graphic speech centres. There seem to be marked congenital differences in human beings as regards the educability of these centres. Occasionally one meets a child who is not deaf in the ordinary sense of the term, but who fails to distinguish profitably the sounds which make up speech. Such a child is said *to* be suffering from congenital word-deafness. More common is congenital word-blindness. School children are found who in spite of good teaching and every opportunity are phenomenally slow in learning to read. Such children are apt to be overlooked for a time in a large class, as they often have a good verbal memory, and having heard a lesson once or twice can repeat it with perfect accuracy. These word-blind children require special sympathy and attention; in extreme cases it may be necessary to use with them methods of teaching adapted to the blind.

The localisation of mental functions in definite parts of the brain tends to impress upon us the dependence of mind upon brain. The evidence of comparative anatomy (*e.g.*, the correlation of degree of cerebral development with degree of intelligence), the action of drugs (*e.g.*, chloroform or alcohol) on mental processes, many of the facts of insanity have all been adduced as pointing in the same direction. To the physiologist mind and brain are inseparable—*that* is, every thought, every desire, every emotion is accompanied by brain action; there can be, so far as his knowledge goes, no mental life at all apart from the building up and breaking down of the cells which constitute the brain. Nor are the laws which regulate the constant inter-

illusion, and has no real existence." The train of thought which results in *In Memoriam*, the heroism of a Grace Darling, the philanthropy of a Howard, can all be expressed in terms of mere mechanical sequence. The same interpretation must be carried into all our most ordinary actions. When we put up an umbrella to shield ourselves from the rays of the sun, our feeling has nothing to do with our action. The course of events is as follows: molecular motion is aroused in the sensory nerves by means of the vibratory heat waves; it is propagated along the nerves to the brain, where molecular disturbance ensues, resulting in a discharge by means of the motor nerves into certain muscles which, by contracting, raise the umbrella. Molecular motion all along the line, motion determined by what has gone before. Thus the self-assertion of matter, combined with the self-forgetfulness of mind, has resulted in the banishment of mind from any real connection with the universe—a strange paradox, truly, especially when it is remembered that these arrogant molecules (so far as they are within our knowledge or even the knowledge of the materialists) are in their origin an ideal construction built up by the mind.

That this representation of the universe is, however, a conceivable one, is shown by the fact that it is accepted by some thinkers. To most of us it is inadmissible for the following reasons.

(i.) It appears to the writers that the existence of a universe in which evolution is going on, and leading up only to more and more complex mechanism, would be simply silly. It would be a universe devoid of purpose or rational meaning, and yet at numerous points producing a kind of existence (consciousness) diametrically opposed in its distinctive properties to

those of mechanism — making no difference to the course of events — yet continually creating illusions as to its own place and importance in the course of events.

(ii.) The mechanical theory would render impossible any belief in such a thing as duty or right and wrong. In a mechanically-ordered universe these terms have simply no meaning. The essence of consciousness lies in the fact that it is purposive: we believe that we have the power of dwelling on some motives and excluding others, and so selecting our own course of action. Our conduct is self-determined. This belief is set down by the mechanicians as an illusion. But why such an illusion should have arisen is unintelligible.

(iii.) It is contrary to the principles of biological science to suppose that any function or power should arise unless there is a demand for it, unless it is of use. On the mechanical hypothesis consciousness is of no use whatever. The actions and words of every individual of the human race would have been exactly what they have been in the absence of consciousness. The same empires would have risen and fallen, the same battles would have been fought and won, the same literature and art would have been produced, the same indications of friendship and affection given. It is impossible to see why consciousness should have arisen as the concomitant of molecular motion of a certain degree of complexity, when we have been assured that this very complexity has arisen without its aid, and will pursue its course regardless of its presence. To say it is involved in the very nature of the motion is simply to take refuge in final inexplicability, or to suggest that this molecular motion is other than we have been led to believe.

It is, after all, consciousness which is the fundamental fact of experience. Every thinker who, like Descartes in his famous *Meditations*, seeks to go to the root of his beliefs, is driven down to this as the one basal certainty. Thus Tennyson in "The Ancient Sage":—

> "Thou canst not prove the Nameless, O my son,
> Nor canst thou prove the world thou movest in,
> . . . .
> Thou canst not prove thou art immortal, no
> Nor yet that thou art mortal—nay, my son,
> Thou canst not prove that I, who speak with thee,
> Am not thyself in converse with thyself. . . ."

If we analyse any most ordinary little item of experience we see the truth of this contention, that consciousness is our most fundamental fact. When we are sitting in front of a fire what do we find?—that we have a sensation we call heat, and also various sensations of colour. All else that we *know* about the fire is made up of our memories of past experience with other fires, and, it may be, of the interpretations which have been put forward by physics and chemistry to explain or render coherent and self-consistent certain sense experiences. Our most ingrained beliefs—that other minds like our own, and also that a permanent order of things in some sense independent of us, do actually exist—may be shown to be ultimately scientific hypotheses formed to account in the most intelligible and satisfactory way for the facts of experience.

It may be replied that if we accept the existence of other minds, and of a permanent order of things, we cannot stop there; if we step beyond the existence of our own single minds at all, we are bound to accept the whole construction of science, for each step follows necessarily on what precedes: at no point can we logi-

cally say thus far and no farther. In a sense this is true. It is only when the mechanical interpretation of the world is put forth as an intelligible explanation of the facts of our experience that we have any quarrel with it. To consciousness nothing can be so intelligible as consciousness, and to talk of explaining mind in terms of mechanical motion is simply an absurdity. It might seem needless to insist on what one might suppose would be self-evident to all; but the magic network which science has woven in the present generation has so ensnared many of our ablest minds, that to them a molecule appears more intelligible—more fundamental—than a thought; a chemical equation than a feeling; a release of atomic energy than a volition.

This is simply a striking instance of the remarkable power which our dominant interest has of colouring our mind. At Windsor, in a conversation with the late Queen, a visitor once referred to "the copper horse at the end of the long avenue." "That is not a copper horse," said her Majesty with surprise, "that is my grandfather." In the same way, to theorists on cerebral molecular motion, we reply, That is not molecular motion, it is my thinking.

§ 5. *Consciousness the fundamental reality.*—Having for these reasons been led to reject the mechanical theory which would reduce man to a "cunning cast in clay," as inadequate to the facts of our experience, we must consider whether the other hypotheses which have been put forward are any more tenable.

The hypothesis which we have just dismissed, laid stress on the material side of things. But since the more fundamental reality, as we have just maintained, is to be found in the world of mind, we naturally ask,

Would it be possible to construct a consistent explanation of the universe in terms of consciousness? In this case our mental life would, so far as we are concerned, express the inmost nature of reality; the activity of the brain cells would be simply the mode in which consciousness manifests itself to our senses, or would manifest itself were it possible for us to see or touch a brain in action. Such a construction would, at all events, seem to lay the emphasis in the proper place. Again, since the human brain is actually part of the world of nature, it would seem to follow that all nature must be regarded as, in its inmost self, life of some elementary kind—as in its essence spiritual. The whole world of nature and course of evolution would be interpreted as life striving towards self-realisation, and culminating in the mind of man. In the case of most of the material world we naturally represent to ourselves the changes which take place in terms of matter and motion, because that is the mode in which they are presented to our senses; but, in the case of our conscious life, we just as naturally regard the changes as changes in thought, feeling, desire, because we know that is what they really are. That they have another aspect—that of brain action—is of no importance except to science, which is in the main concerned only with the world of the senses, or world of description as it has been called.

This theory with respect to the world of science involves a complete inversion of our usual point of view; hence we have at first considerable difficulty in even grasping its import, much more in accepting it. But even apart from this psychological stumbling-block, its path is by no means clear before it. The diffi-

culty that now besets it is a serious one, but one that has to be faced by every theory except the purely mechanical.

This difficulty, brought to its sharpest focus, is this: What is the relation of the hypothesis now under consideration to the scientific conception of the human brain? For we cannot simply ignore the contention of science that all mental changes can be represented under a mechanical aspect. If it be possible for any series to present itself continuously under a mechanical aspect, then it must itself be in its nature mechanical, and in no sense self-determinative; and in this case of what importance is it whether we regard it as material or spiritual in its essence? In either case, all our highest beliefs and aspirations must be dismissed as illusions. If, on the other hand, the purposive interpretation of the world is to hold, if man is in any real sense of the word an *agent*, then the general truths discovered by science, and known to her as laws of nature, cannot hold throughout the whole of nature.

§ 6. *Possibility of compromise.*—If, then, we accept the purposive theory of the world, the theory which allows man to be an agent, at what exact point must we diverge from the mechanical theory, and how can this divergence be shown to be compatible with the work which has been actually achieved by science?

Now, in the first place, no one will deny that a large part of our mental life may be regarded as mechanical,—our ideas come in trains, one state of consciousness arises out of the preceding, our volitions are determined by motives. One can easily conceive that many such successions of thought might fairly appear under the aspect of brain changes taking place in accordance

with physical laws. On the mental side this fact is represented by the consolidation of character. Again, many of the phenomena of insanity — such as fixed delusions — show that the mind has a tendency to degenerate into mechanical action. Even in the conversation of people of a low intellectual type this tendency may be seen in the way their stream of talk flows on under the influence of one dominant idea or directed by passing distractions, without showing any real mental grasp or guidance. Indeed most of us can carry on a fairly rational conversation about ordinary matters on very mechanical lines while our real minds are busy about other business.

But when all is said, there comes a point at which we must draw the line. Man's life is not ruled by mechanical laws throughout. He is, it is true, conditioned by what we may call the mechanism of the mind, and must work in accordance with its laws. Thus he seeks forgotten knowledge by aid of the principles of association of ideas, he initiates connected trains of thought, and so seeks to bring into consciousness the idea he wants; he guides his will by motives, laying stress on one to the exclusion of another. But at such initial points the course of mental change is not mechanical, determined from behind; it is purposive, determined by ends or ideals. And if we admit this, it is perfectly clear that the physical changes in the brain, which are the concomitants of these mental changes, cannot be in absolute conformity with mechanical laws. We cannot, of course, prove that in any such cases we really are agents in the sense of being able to direct our own course, for to do so we should have to turn back the wheels of the universe, and, standing again at the parting of the ways, do that

which on the previous occasions we did not do. That we can dwell on higher motives to the exclusion of the lower, that we can in a word build up our own character, is in the main a matter for "belief." But as we have already argued, any other view is so unintelligible that we should decline to accept it in the face of almost any so-called proof.

Now, as matters stand at present in the scientific world, there is no such proof. We have spoken above of the "contention of science that all mental changes can be represented under a mechanical aspect"—in other words, that brain action takes place exclusively in accordance with physical and chemical laws. But this is in reality not so much a contention as a pushing of scientific hypotheses to their logical conclusion in domains where they have never been verified by experiment. In the main this has been done by men who have never clearly realised that the scientific attitude involves any presuppositions at all. Many men of science who do realise this expressly guard themselves against such conclusions by stating that science does not pretend to offer explanations, if by explanations be meant ultimate explanations. It is clear that only in the light of the hypothesis that the ordinary physical laws do hold in the brain can physiology hope to make any progress in her study of that organ. In this study during the last fifty years she has done a marvellous work which stands as an enduring testimony to the perseverance and ingenuity of man. And there is still a large hardly touched field before her where, as we have shown above, it is probable, from what we know of the mental aspect of things, that mechanical laws do in the main hold. But when she comes—if she ever does come—to

investigate what action takes place in the higher centres when the processes of choice are going on, then her hypothesis will fail her.

But it will be said, It is not in view of the advances made by physiology in the region of brain research but in the light of more general considerations that it is thought that the mechanical view must be true of the world as a whole. The great law of the conservation of energy demonstrates conclusively that no action not predetermined can take place. Here we must remind ourselves that the law of conservation, like the other laws of science, is merely a generalisation: it must not be transformed into a fetish and held to be necessarily true in regions where it has not been tested. The complexity of the processes of life is such that it has not yet been proved true with regard to man. We grant, however, that various considerations render it not unlikely to be true that man in the long-run gives back in other forms all the energy which, in the shape of food, &c., he has received from the general store. But even if this be true, nothing is said about the *direction* of this energy which man appears able to turn to his own uses; the law refers to quantity only.

So long as the quantity of energy going in and the quantity of energy given out are equivalent, then the law is fulfilled. Hence we maintain that the supposition that the transformations of energy taking place in the brain can be guided now in this direction, now in that, does not conflict with the theory of conservation. If it be true, then, as we are at present surmising, that brain change is merely a symbol of mental change, and if it be true also that man's life is in essence purposive, then it follows that the processes of choice would be represented in the material world by changes in the

cerebrum which would appear as self-directed transformations of energy—that is, changes which could not be predicted by any natural law.

§ 7. *Only two alternatives possible.*—There are only two alternatives open to us here—either life is mechanical or it is not. If it is not, it cannot possibly be presented entirely, as physiology for her own purposes quite legitimately assumes, under the form of a series of mechanical changes. We think the hypothesis that there is at certain points in the universe a breach of the laws of motion—for, as we have seen, all forms of energy may ultimately be reduced to motion—leads to fewer difficulties than the hypothesis that mechanical laws hold throughout. But in the nature of things this negative hypothesis which we adopt can only be proved true by the failure to establish the opposite. And in the present state of science we certainly cannot yet fairly claim that this failure has taken place, for we are, as has been pointed out, merely at the beginning of the scientific study of the brain.

Meanwhile both physiology and psychology are justified in making use of whichever hypothesis suits them best, but we ought frankly to recognise that the time is not yet ripe for a final decision between them *on scientific grounds.* Science ceases to be science when it becomes dogmatic and seeks to enforce a premature generalisation.

With respect to the particular point in dispute between the determinists (who believe that life is nothing but mechanism) and the self-determinists (who believe that man is a self-directed agent in the course of events), there are, we have maintained, only two alternatives, and every theory of the connection between mind and brain has to choose between them.

But the two theories as to this connection with which we have dealt (see above, §§ 4 and 5) do not exhaust the possibilities. There are at least two others which take rank as living hypotheses; and to these we must now turn.

§ 8. *The theory of Parallelism.*—The third theory is that of Psycho-physical Parallelism or the Double Aspect Theory. According to this theory there are two series of events—the one psychical, consisting of changes in consciousness, the other physical, consisting of changes in the cerebrum. These two series run parallel with one another in the sense (1) that they take place in the same time, and (2) that any definite cerebral condition is accompanied by a definite psychical condition; or, to put the same thing from the other point of view, if any psychical state is repeated, then the cerebral state which synchronised with the first psychical state will be repeated with the second. The two series are supposed not to interact with one another.

This theory is evidently in a state of unstable equilibrium; we inevitably tend to throw the emphasis either on the physical or on the psychical series: if we choose the former, and if at the same time we admit that mechanical law holds throughout the physical world, we simply arrive at the mechanical theory set forth above, and consciousness becomes an "epiphenomenon." If we choose the latter, and if at the same time we are prepared to admit that mechanical laws do not hold throughout the physical world, then the theory becomes indistinguishable from the one we have just discussed.

If, again, we attempt to regard the two series as of equal value,—if we say they are simply two aspects, neither of which takes precedence of the other, then

we may say "aspects of what"? Are we to postulate some reality which thus manifests itself, and, if so, what is the reality?

Moreover, a moment's thought will convince us that this theory has been constructed with the facts of brain action (the "given" of the physiologist) too much in view, and the facts of mental action (the "given" of the psychologist), too little. When we attempt to work it out in detail we find our thought beset with difficulty. The completion of the physical series necessitates our pressing beyond the cortex to other parts of the brain, and to outlying parts of the body. The brain activity which is the physical aspect of experience can be traced back along sensory nerves to changes in the organs of the body, and these in their turn can be traced to other material changes within or without the organism. But no one supposes that these changes have a conscious aspect. The physical series can be completed: the psychical series cannot. The physical series shows a striking continuity—a continuity which is as strikingly absent from the mental series.

The words psychical and mental in these two sentences are used as equivalent to conscious. This equivalence may be questioned. It may be said that although admittedly the conscious series is broken, yet the mental series may be continuous. Such a supposition cannot be disproved; we may, if we like, suppose that all material processes have a mental aspect, of which we know nothing. Such a hypothesis leads us either to think of the higher mental processes as created by the activity of matter and so dependent on it, or to develop an atomic theory of mind, each material atom having, as it were, a mental nucleus or aspect. This latter hypothesis has been adopted by some philosophers, but when we attempt to build up mind as it is known to consciousness out of such discrete units we come upon insuperable difficulties.

Nevertheless the hypothesis has been seriously put

forward, that to every particle of matter in the universe there is attached an element of feeling or sentience. W. K. Clifford, who vigorously defended this doctrine, called these minute particles of sentience, "mind-stuff"; and the use he made of the doctrine is shown in the following statement: "When matter takes the complex form of a living human brain, the corresponding mind-stuff takes the form of a human consciousness, having intelligence and volition" (see essay "On the Nature of Things in Themselves," *Mind*, first series, vol. iii. (1878), p. 64). The arbitrary hypothesis of mind-stuff avails little in relief of the difficulties of the Mechanical Theory. The material particles are conceived to be combined in the brain according to mechanical laws: how are the corresponding particles of sentience combined? In thought, especially in the unity of consciousness involved in judgment and self-knowledge, we have a concrete indivisible activity, which, accordingly, must pertain, not to an assemblage of particles of sentience devoid of intelligence and volition, but to a single central agent or permanent principle of intelligence and volition. Nor are the difficulties of Materialism affected by any distinction between "matter" and "force." In fact, such distinctions only conceal the real point at issue—the place of Mechanism in the universe. The Mechanical Theory means that the substance of the world (whether that substance is defined as "matter," "force," or "mind-stuff") has, as its most fundamental attribute, motion determined *a tergo*. If it manifests itself not only in mechanism but also in other modes of activity, this means that there are changes in the universe where mechanical laws do not hold.

If we dwell on continuity as an observed fact, it is inevitable that the physical series should be regarded as primary. On the other hand the mental series, as it appears in consciousness, has a unity of which the physical series shows no trace. If we could regard the mind as simply a stream of sensations, one following upon the other and taking its place, such a psychical succession might conceivably be an "aspect" corre-

sponding point to point with the physical aspect. But the essential character of our mental life is not a smooth flow of conscious experience; it is the active arranging and grasping of selected portions of that experience, a grouping of disparate sensations so as to obtain unity in diversity, an introduction of meaning and purpose into the chaos that comes to us through our senses. This unity, which includes the past and the future, and to indicate which Professor James used the term "soul," belongs exclusively to the mental side; there is nothing like it on the physical.

It may be said that the mental act corresponds to the entire cortical process, and that this is the appearance of the unity on the physical side. But, as Professor James has pointed out, we have no reason to regard the brain as a unity in its own right. Imagine the world as to the physicist it really is, picture the circling atoms in their ceaseless dance, and then say why those particular ones which form a brain are to be regarded as a unity. As an illustration, think of the constellation of Orion. We see clearly that there is no real unity here: we group together the stars included merely for fanciful reasons of our own. But if we could imagine one intelligence to rule those particular stars and no others, then we should have a real unity. Well, it is replied, that is exactly what we have in the case of the brain; this particular congeries of atoms represents one intelligence. But that is precisely the point we are urging; the unity is exclusively a feature of the mental side. If this be so, how can the psychologist admit that the physical series runs parallel with, or represents, or even corresponds to, the psychical series, if these words are taken to imply that the two series are of equal value?

The unity of conscious life, with one combining centre of its simultaneous variety and temporal succession, is utterly without parallel in the material series. For further illustrations of the contrast, see Lotze, *Microcosmus* (Eng. tr.), bk. ii., ch. i. § 4 (on the unity of consciousness), and ch. iv. § 1 (on the *relating activity* of the mind as a process of unification), and the same writer's *Metaphysics*, §§ 241, 268, 273; also James Ward, *Naturalism and Agnosticism* (Gifford Lectures), vol. ii., lectures xi.-xiii.

§ 9. *The theory of Interaction.*—There remains now but one more theory which we need discuss, and that is the ordinary common-sense hypothesis of Interaction. A great philosopher once said, "the fact that my will moves my arm is no more intelligible to me than if it held back the moon in its orbit." Nevertheless he believed that his will did move his arm.

The point which the interactionists are concerned to defend is simply this,—that man is a real agent in the course of events, and in his reaction upon his environment he has an initiative of his own.

So far in this chapter we have been considering the relation between mind and body as an ultimate question, always keeping in view the fact that when the informing mind withdraws from the body, the matter of which the body is composed remains but breaks down into simpler forms. The mind, so far as our evidence goes, disappears, yet it may not cease to exist; it may, as some thinkers believe, simply alter the mode of its activity, the new mode being imperceptible to our senses. It may be long before we attain to scientific demonstration of such existence, but that is no reason for refusing to consider its possibility.

Interaction as usually understood does not refer to

this ultimate question, but to the way in which even to our ordinary every-day observation mind and body are interlinked. Thus worry interferes with nutrition, shame flushes the cheek, mental depression is produced by bile. Conscious processes which, as we have indicated, are held to be in immediate association with cortical processes are conditioned by what is going on in every part of the body. Modern work on the endocrine or ductless glands has served to call general attention to, and to render more explicit, the extent and character of this interdependence.

The chief endocrine glands are (1) the thyroid, a small organ weighing about 1½ oz. and resting against the larynx and windpipe, (2) the supra-renal capsules or adrenals, one of which is closely attached to each kidney, (3) pituitary body, and (4) the pineal gland, both situated at the base of the brain, (5) the sex glands, and (7) the pancreas. The function of each of these glands is to manufacture a specific organic substance which when discharged into the blood stream, produces effects of the most far-reaching and extraordinary nature. For these substances the name "autacoid" has been suggested. The autacoid produced by the supra-renal capsules is known as adrenalin. When adrenalin is passed into the blood stream it liberates sugar from the supply stored in the liver, thus increasing the food supply of the muscles; it also acts directly on the muscles in such a way as to neutralise fatigue products; it causes constriction of the smaller blood vessels, thus maintaining or increasing blood pressure. Certain emotional states, notably anger, are accompanied by activity of the adrenals: to which activity the frequently observed increase of strength in the angry man may be attributed.

Even more remarkable is the work of the thyroid gland. When in an infant this gland is deficient, or absent, the child grows up inert, sluggish, a dwarf, and an idiot. On the other hand if the condition is recognised at an early age and suitable quantities of thyroid are administered regularly by the mouth, the child may grow up to all appearance perfectly normal. In other cases feeble-mindedness may persist, in spite of the fact that satisfactory body growth is established. The mental and physical condition produced by thyroid deficiency is known as "cretinism."

These illustrations serve to show that we must not make *the mistake of regarding the brain as exclusively the organ of mind.* Intellectual ability is conditioned by the thyroid just as truly as by the grey matter of the brain. The organism is one, and all parts must function efficiently and harmoniously if the instrument is to be perfected. But these modern discoveries, though most interesting and important, do not at all affect the philosophical position. They render the relation between mind and matter neither more nor less obscure than it was before. It still remains possible to regard the body as an instrument by means of which the mind more or less clearly expresses itself in this particular world.

We are familiar with the assertion that consciousness is a "function" of nervous matter, when that nervous matter has attained a certain degree of organisation. We may take up this confident assertion of the mechanists and materialists, and put a new meaning into it,—a meaning which, while it excludes materialism, has at least one logical merit: *it cannot be disproved.* What is meant by a "function of matter"? It means, we reply, simply this: body, nerve, and

brain are the instrument by which the conscious mind manifests itself in the spatial and temporal world. In this way the mind is dependent on the instrument, which has a transmissive function in relation to it. The instrument is of almost infinite delicacy and complexity. Different kinds of mental action express themselves by means of the action of different portions of the brain, and so depend instrumentally upon these brain-tracts. And if the instrument breaks down—as in brain disease or decay—the mind's communication with the world is hindered or disordered, or it ceases altogether, but it does not follow that the mind has ceased to exist. A good illustration is furnished by the "dynamo." A dynamo is said to be a machine for "producing" electricity. This is inaccurate, and is quite false if "produce" means "create." A dynamo is a machine for *bringing into action* the electric energy which is already there—it does not create but transmits it and enables it to manifest itself. The transmission of the force at that particular spot and in that particular way depends entirely on that particular dynamo; but the force is not destroyed if the machine breaks down—it merely ceases to be transmitted *there*.

Those who hold the instrumental theory to be the truest one are prepared to maintain that the mechanism of brain and nerve does not in any way manufacture the mind, but manifests it or enables it to express itself or transmit its activities; and in manifesting these activities, the brain and nervous system control and confine them within certain limits. If any injury to the brain appears to injure or destroy consciousness, what really happens is that the self-expression of that consciousness in those particular ways is injured or destroyed. For example, suppose the injury affects a minute portion of the brain,

and that in consequence the patient's mind appears to be emptied of a whole class of ideas, in one of the ways described above (§ 3). The patient is "in the body"; he is not free of the material brain but is living through it. Hence a diseased function of the brain, localised in a particular area, must form a positive obstruction to the healthy activity of the corresponding mental function, which, in this way and in no other, is a "dependant variable."

On the "transmissive function" of body, nerve, and brain in relation to mind, see William James, *Human Immortality* (Ingersoll Lecture), pp. 32-58, 142-144. Bergson's conception of the relation of mind and brain is essentially in harmony with what we have called "the instrumental theory"; see his *Matter and Memory* (Eng. tr.), *passim.*

All the most important questions arising from the relation of Mind and Body are brilliantly analysed and their issues discussed by Dr C. D. Broad, *The Mind and its Place in Nature.* The book is perhaps stronger on the expository and critical than on the constructive side; but it is indispensable to the student who wishes to grasp the problem as it stands at the present time. Other important statements are McDougall's *Mind and Body* (a powerful defence of the interactionist theory), and Lloyd Morgan's second series of Gifford Lectures, *Body, Mind, and Spirit.* Bosanquet's *Three Chapters on the Nature of Mind* (posthumously published) contain a suggestive examination of several of the fundamental questions, especially (in ch. iii.) a critical account of Bertrand Russell's *Analysis of Mind.*

CHAPTER IV.

GENERAL CHARACTERISTICS OF MENTAL LIFE.

§ 1. *Mind and consciousness as fundamental terms.*—Hitherto we have freely used the term mind (or "mental," to which "psychical" is equivalent) without attempting to define it. We must now point out that this term is not definable in the ordinary sense of the latter word; only when we know everything there is to know about the mind can we "define" it. The term "consciousness" is almost equally fundamental, for it covers a great part of what we denote by "mind"; and it is "indefinable" in the same way. We can only refer to our own experience and give examples of it. "Whatever we are when we are awake, as contrasted with what we are when we fall into a profound and dreamless sleep, that it is to be conscious; what we are less and less, as we sink gradually down into a dreamless sleep, or as we swoon slowly away; what we are more and more, as the noise of the crowd outside tardily arouses us from our after-dinner nap, or as we come out of the midnight of the typhoid-fever crisis,—that it is to be conscious."[1]

Very misleading metaphors have been used with regard

[1] Ladd, *Psychology, Descriptive and Explanatory*, p. 30.

to mental processes. Thus John Locke, one of the founders of the British School of Psychology, in his *Essay Concerning Human Understanding* (1690), speaks of mental life as "the scene of ideas"; by "idea" he usually means what we mean by "mental process," but he started the custom of speaking as if "ideas" were in some way like separate things that could move about in the mind and act and react on one another. The reader must carefully bear in mind that there is no ground for any such assumption. Many writers have spoken of the subject-matter of psychology as being "states" of mind or of consciousness. All the associations of this word are misleading. To talk about "states" of mind as a scientific term, not as a mere literary expression (as we may sometimes use it), inevitably implies—to put it roughly—that the mind may be compared to a kind of fluid that is capable of being put into various shapes—*i.e.*, that the mind is something passive or inert, and has various "states" belonging to it. The natural result of such a view of the mind is found in the writings of David Hume in his *Treatise of Human Nature* (1739), and of John Stuart Mill in his *Examination of Sir W. Hamilton's Philosophy* (1865), who defend the paradox that the mind is nothing but a series of these "states of consciousness."

§ 2. *"Focus" and "margin" of consciousness.*—As the intensity of consciousness decreases, it does not break up into separate parts; differences and changes in it, which were distinct, begin to fade away. We can imagine this process going on, but its final result would be a formless state of feeling impossible to describe. As consciousness increases in intensity, it embraces a larger number of objects or details, and the details themselves and their relation to one another grow more distinct. These general facts are sufficient to familiarise us with the notion of consciousness as a thing of degrees, of "more or less."

This is experienced in ordinary waking consciousness, where we always find different degrees of consciousness

at the same time. There is, first, the region of fullest attention, where our mental activity is most intense; this is called the "focus" of consciousness. Then there is the region of dimmer consciousness, lying round the focus; this has been called the "margin" of consciousness. Ideas and impressions are constantly passing from the focus to the margin, and *vice versa*. If, in looking at a picture, I scrutinise the execution of a single detail, that is the focus, and the rest of the field of vision (as long as I continue specially attending to that detail) is the margin. If I have forgotten where I placed a certain object yesterday, and with effort try to retrace in memory, in order, everything that I did on that day, I develop in the focus of consciousness a thought process representing my proceedings, while all the sights, sounds, feelings, &c., which enter into my consciousness at the same time are only marginal. If I am sitting in a railway station waiting-room, reading a book which is interesting but not difficult, there may be continual noise from persons passing in and out and talking, from the arrival and departure of trains, from the street outside; and not only hearing but all my senses are appealed to; but while I am intent upon the book, the ideas suggested by the printed words are in the focus of consciousness, and all the other experiences in the margin.

The reader should never take on trust any illustrative descriptions of psychological situations; he should test them by observing similar situations for himself.

The focus and margin together make up the "field of consciousness." This field never has any definite limits, and may vary greatly in extent. The farther from the focus, the less clear the ideas; and it is impossible to say where consciousness leaves off.

It is obvious that an impression marginally received—*e.g.*, dimly heard or imperfectly seen because the attention is not directed upon it, is, as a mental process, different from the impression that would be made by the same stimulus when attention is fully directed upon it. Similarly, the student must beware of thinking that (a focal idea and a marginal idea are the same, as mental processes, even when referring to the same object.)

This important fact may be illustrated by a development of our last illustration. If the book which I am reading grows more difficult as I go on, and I am still interested in it, I may become "wholly absorbed" in it, so that all the noises, sights, sounds, &c., around me may appear to make not even marginal impressions on my mind, and I should not even hear a remark addressed to me. In this case, however, appearance is deceptive. The commotion around is producing some impression, for were it to cease, a change in the total field of consciousness would at once take place. Similarly, when you are at work in a room, a familiar sound—such as the ticking of a clock—may cease to be noticed; but if the clock suddenly stopped, the silence would seem greater than before.

§ 3. "*Depth*" *of consciousness: unconscious processes.*—The metaphor of "field" is not the only spatial metaphor applicable to consciousness. Besides extent there is also "depth." Almost any conscious process, when maintained in the focus, begins to develop. There appears to be more *in* it than is revealed on the surface. For example, the characteristic tone-quality, timbre, or clang[1] which distinguishes musical notes of the same pitch sounded on different instruments (*e.g.*, the note *A*

[1] The technical use of this term must be distinguished from its popular use.

on a violin and on a flute) seems to the unpractised ear a simple quality; but the trained ear can analyse it into a fundamental tone (after which its pitch is named) and a number of overtones. The difference in number and intensity of these overtones makes the difference in timbre, which is the total effect of their combination.

In further illustration of what we have called "depth" we may refer to what may be technically termed "undiscriminated parts of a discriminated whole,"—where processes of mind, singly unnoticed, contribute to a total effect which is noticed. When we are looking at a distant forest, we see an expanse of green in which we certainly can discern no parts corresponding to the single leaves, nor even, perhaps, any corresponding to the single trees. It is not, of course, to be supposed that each leaf affects the mind separately; but the combination of so many waves of light certainly produces a change in the brain to which corresponds a compound sensation whose component parts are *combined* into one expanse of colour. A similar remark applies to the hearing of the distant murmur of the sea. The many separate waves of the sea produce a multitudinous vibration of the air; and this again affects the brain, and to this process there corresponds a sensation which is by no means so simple as it appears in consciousness to be. "Deeper" still, processes seem to go on which do not have the attribute of consciousness at all. Lessons half learned at night are better known in the morning. Problems unsolved when we go to bed are found to be solved when we wake. Somnambulists do rational things. We waken at an hour predetermined overnight.

There are facts which compel us to the conclusion that unconscious processes are a constant factor in

the development of our conscious life. "The onward flow of thought," says Professor Stout, "depends in every moment of its course on the co-operation of an organised system of conditions which have indeed been formed in and through bygone conscious experience, but which are not themselves present to consciousness. Consider, for instance, the process of recollecting a name. The endeavour to recollect is a conscious process, but its success or failure depends on another factor. It depends on the trace or disposition formed in the course of previous conscious experience in which the name has occurred. Conditions connected with this trace or disposition determine whether the name will be recalled at once or after prolonged effort or not at all. It may happen that we fail to remember the name while we are trying to do so, and that it suddenly emerges into consciousness after an interval during which we have been occupied with other matters or have been asleep. This implies that our conscious effort has set going an unconscious process which continues after the conscious effort has ceased. Now, what holds good of the attempt to recall a name holds good throughout our mental life. Whether my thoughts come to me fast or slow, easily or with difficulty, they come to me only through the co-operation of unconscious conditions. My conscious processes constantly set in operation processes below the threshold of consciousness, which in their turn give rise to new developments of conscious process. My conscious activity is never the sole factor involved. It always makes appeal, so to speak, to something else, and awaits the result, which may or may not be such as it requires."[1]

[1] 'Hibbert Journal,' Oct. 1903, pp. 47, 48.

Some writers who see the importance of recognising that *mind* is deeper than *consciousness*, have accustomed themselves to speaking of an "unconscious *idea*," an "unconscious *wish*," and the like. Strictly speaking, any such expression is nonsense. It is like speaking of an "unconscious conscious process." It is admissible only if understood as verbal shorthand. (An "unconscious idea" or "wish" is a mental process which *when it manifests itself in consciousness*, or *if it could manifest itself directly in consciousness*, would produce an idea, desire, or emotion, as the case may be.)

The most important advances in psychology in recent years have sprung from an effective recognition of two facts. (i.) The dynamic or driving power of mind is not fully expressed in conscious processes. There is no need to fall back on neurology or physiology when we speak of mental operations *before they become conscious*, or which, like those producing associations, really never become conscious. Such operations may with perfect appropriateness be described as "mental" and as "unconscious." (ii.) Through the investigation of abnormal mental conditions, as especially through the sounder methods of psychoanalysis, some real knowledge of the structure of the unconscious may be acquired, and some of the laws governing the operations of its factors may be ascertained and tested.

We have not used the word "subconscious." It is not needed, as it must be equivalent to the "marginal" or the "unconscious," and its use has been found to lead to confusion. See for example *Subconscious Phenomena*, published by Rebman, Ltd., 1910, and containing a symposium by Münsterberg, Ribot, and others. The ambiguities of the term are shown in the conflicting views expounded in this book. William James has lent his authority to the word in an unfortunate way. In *Principles of Psychology*, vol. i., pp. 164-174, he criticises the assumption of "unconscious" mental states, while elsewhere (*Varieties of Religious*

Experience, pp. 230-236, 483, 511-513), he speaks with approval of carrying the notion of the "subconscious" to the most extreme lengths.

Three important stages in the discussion of the problem of unconscious mental operations are marked by the treatment of the topic (i.) in Mill, *Examination of Hamilton*, ch. xv.; (ii.) in Stout, *Analytic Psychology*, vol. i., Introduction, pp. 21, 26, and Ward, *Psychological Principles*, ch. iv. § 6, 7; (iii.) in Broad, *The Mind and its Place in Nature*, ch. viii., ix., x. Very suggestive is the treatment given by Höffding, *Outlines of Psychology* (Eng. tr.), ch. iii., pp. 71 ff. The distinction of "focal" and "marginal" consciousness is illustrated in Lloyd Morgan, *Comparative Psychology*, ch. i., and Külpe, *Outlines*, pp. 290, 291 (cp. pp. 190, 443). A useful historical and critical account is given by W. L. Northridge, *Modern Theories of the Unconscious*.

§ 4. *Psychological dispositions.*—We may ask, in the next place, whether these mental processes, conscious and unconscious, which we have been discussing make up the sum total of mental life. In what form, for instance, do all our acquired ideas, our knowledges and memories, exist when we are not *using* them—*i.e.*, when there is no reason for attributing to them activity (conscious or unconscious)? We are capable of recalling innumerable items of past experience; do all these items of knowledge and memory exist below the level of consciousness? and if so, what is meant by the word "exist" in this connection?

To this question there are two answers, not necessarily conflicting with each other: that all these acquisitions exist in the form of a psychological disposition (mental), and that they exist in the form of a physiological disposition (cerebral).

The popular meaning of the word "disposition"—a

more or less permanent tendency of mind expressing itself in characteristic ways of thinking and feeling—may be used to illustrate its psychological meaning. Thus, love, or hate, is an acquired psychological disposition, showing itself in certain overt impulses or feelings in consciousness; but it is not exhausted in these,—it persists as a comparatively permanent state below the level of consciousness. In the same way, thoughts and sensations may be merged in an unconscious mental disposition, which remains as a result of the occurrence in clear consciousness of those thoughts and sensations. I meet a man to-day; I do not think of him at all until I meet him again after a week, when I recognise him at once. I am able to recognise him only because my experience of the week before has left an after-effect which persists, and in its turn has an effect on my present consciousness. The same process is illustrated, again, in every *acquired habit;* each performance of an action leaves a trace, and the traces accumulate at length into a strong or even an irresistible disposition.

The word "sentiment," introduced by Mr A. F. Shand and adopted by Professor McDougall to signify "an organised system of emotional tendencies centred about some object,"[1] would include most psychological dispositions. The writers referred to stress the emotional elements in the sentiments, which undoubtedly are prominent especially in sentiments which begin to be formed in early childhood. For example, an infant very early begins to show specific modes of behaviour relatively to the father. A psychological disposition,

[1] McDougall, *Social Psychology*, 16th edition, p. 122.

which is stirred into activity whenever the father appears, is coming into being. This forms the nucleus of the "father-sentiment." Later, as the child becomes capable of thinking about the father in his absence, the manifestations (in consciousness and in behaviour) of the sentiment increase in number and variety.

To distinguish the chief sentiments, and to discover the laws of their formation and growth, are important parts of the task of psychology.

Some people maintain that these dispositions are not psychological but physiological—*i.e.*, more or less permanent modifications of brain and nerve. Such people would also refuse to recognise unconscious *mental* processes, preferring the term "unconscious cerebration" introduced by Carpenter in his *Mental Physiology*. To them "mind" would be equivalent to consciousness, a position which we believe to be untenable. It is possible that the formation of psychological dispositions is accompanied by the formation of such physiological modifications; therefore, for convenience and as a matter of method, they may at times be regarded as if they were physiological dispositions. But to say that, fundamentally and as a matter of real existence, the psychological disposition *is* a physiological one, would be materialism; and this is a position which psychology has no right to take up, as long as we understand by the brain what physiology understands by it, namely, a complex of mechanical motions.

§ 5. *Learning by experience.*—No one has direct knowledge of any mental processes except his own. Thoughts may be communicated by words or signs to another person, and that other may reproduce their

meaning in his own mind; but no one else can ever know the thoughts as they are for the one who thinks them. Each man in the same way feels his own feeling and only his own feeling. In this sense, "our hermit spirits range apart."

> "Yes! In the sea of life enisled,
> With echoing straits between us thrown,
> Dotting the shoreless watery wild,
> We mortal millions live alone.
> The islands feel the enclasping flow,
> And then their endless bounds they know."
> —MATTHEW ARNOLD, "Isolation."

By what method then do we arrive at any knowledge of the existence of mind in other people and in animals?

Students of Comparative Psychology are agreed to take as a true test of the presence of mind in some form, the capacity to learn by experience. The word experience, in its etymological origin, is *experientia*—that is, practical acquaintance, efficiency, and skill, as the result of effort and trial. The child, once burnt, that dreads the fire,—the bird that, having seized in its bill a butterfly of a certain colour, and finding it distasteful, avoids butterflies of that appearance in future,—the dog that recognises the signs of his master "going out," and bounds about in delight in anticipation of a run,—are familiar instances. At higher levels of life we see the same principle at work; as in the case of the child learning to walk, or the man training himself in some new form of skill. In short, a little reflection will convince the reader that experience is always acquired experience; it is the pro-

cess of becoming expert by experiment (including all kinds of active effort and trial). The whole story of evolution confirms this. Bodily organs become developed where they are needed; but why are they needed? Because life is not passive and motionless, but is ever striking out into new experiments and efforts.

We said that the ability to acquire experience is a true test of the presence of mental life: it does not follow that it is the all-sufficient test—*i.e.*, that when there is no evidence of this capacity (as in the case of the moth that burns itself again and again in the flame until it is destroyed) there is no kind of mental life.

We have now to see that this process of learning by experience is not only a sure sign of mental life, but also suggests some important facts about that life. A mind that can learn by experience must of course be living in, and must adapt its life to, a real outer world or environment. From the point of view of physiology, this means that it is an embodied mental life; only by means of a bodily organism of some kind could it get into connection with its environment at all.[1] Our special question, however, is from the point of view of psychology, and relates to what mental processes are implied in this connection with an environment.

An embodied mind that can learn by experience can *perceive* some at least of its environment; and this present perception must be modified by traces of similar

[1] The reader will notice the peculiar position which the bodily organism occupies in this connection. It is (1) *the* indispensable means by which mental life may express itself in, and act and react on, its environment, and (2) *a* part of that environment itself. The body is both these things at the same time.

past perceptions and of the special experiences connected with those past perceptions. The meaning of this statement will be made clear by the following illustrations.

Let us suppose a moth "seeing" a gas flame for the first time in its life. We must assume it to feel a sensation of brightness which attracts it. Expressed in physiological terms, this attraction is a stimulus which drives it towards the flame. It then feels the germ of what in a fully developed mind would be called a great shock of pain, which instantly drives it away from the flame. Again it feels the attractive sensation. We may assume (for the sake of illustration) that the second sensation is more distinct owing to the previous occurrence of a similar one—*i.e.*, that it is modified by traces of the previous sensation. But so far there is no trace of *experience*. There is only a slightly brighter sensation; and the original performance is repeated with the same result.

What, then, is the *minimum* of conscious process necessary for experience? A bird has several times taken in its bill a butterfly and dropped it, finding it unpleasant. The next time it sees a butterfly ot that colour, it does not touch it. We are now on a level of mental life much higher than that of the moth; but there is no reason for assuming anything like developed memory, or even any separate idea or image contrasted with present perception. The several experiences of tasting the nasty insect leave traces behind them; it is necessary, but also sufficient, that these accumulated traces should have strength enough to *tinge with unpleasant feeling* the next perception of that kind of insect—and the insect is not touched. A mature human being might have a similar experi-

ence; he would express it by saying, "that *looks* unpleasant," without having, at first, any idea *why*. But he would not stop where the bird stops; he would go on to ask himself why, and try to recall in memory the occasion on which he had actually experienced the unpleasantness. More usually the sight of the object would without effort arouse the idea of the previous unpleasant experience. This is not required to account for the bird's action.

Hence we said that a mind which can learn by experience must be able to have its present perception modified by traces of the special experiences into which similar perceptions entered in the past. We have also seen incidentally that such traces operate at different mental levels: they may be effective in determining present action without involving the presence of a separate idea of the past. In this modification of perception by traces of past experience we have the beginnings of knowledge. The capacity of retaining traces of the past is usually called Retentiveness. We say, then, that a mind which can learn by experience must be capable—

(i) of *knowing* its environment to a certain extent,

(ii) of *acting on* its knowledge.

The oldest classification of mental processes adopted this "bipartite" or twofold division into knowing and doing—intellectual and active powers. It corresponds conveniently to the physiological distinction of incoming and outgoing nerve-currents. Only in comparatively

recent times was it seen that this distinction, though accurate, is not sufficient.

When action is taken on account of knowledge, we must ask why it is done. It is owing to the knowledge; but when we look more closely we see it is because the mind is *affected* by the knowledge in a certain way,—because it *feels* in a certain way. Knowledge acts through feeling,—it requires the warmth of feeling before leading to action. This is the case even with the highest motives: thus, conscience operates only through the emotion of reverence which it induces for itself; by means of this reverence it enters upon the control of other feelings.

We must therefore distinguish three main varieties of process in mental life: knowing, feeling, willing. The following terms are also in use: for *knowing*, "presentation," "cognition," or "intellection"; for *feeling*, "affective processes"; for *willing*, "activity" or "conation" (Latin *conari*, to endeavour).

The twofold distinction of mental powers into "intellectual" or "cognitive," and "active" or "motive," goes back to Aristotle (d. B.C. 322). In Aristotle's view the main distinction in human nature is between νοῦς (reason or intellect) and ὄρεξις (including sensuous impulse, desire, and will). The medieval philosophers, following Aristotle, adopted a twofold distinction into *intellectus* and *voluntas*. This remained current in Europe until the last quarter of the 18th century. At length the separation of feeling from understanding and will was proposed and defended by a little-known psychologist Tetens (*Ueber die Menschliche Natur*, 1777). This new distinction was adopted by Kant in his great treatise *Kritik der Urtheilskraft*, part of which dealt with the conditions of Æsthetic perception (1790). He also expounded the threefold division in his *Anthropologie* (1798). In English psychology Thomas Reid (*Intel-*

lectual Powers, 1785, *Active Powers*, 1788) gave currency to the bipartite division until the time of Sir William Hamilton (Professor in Edinburgh University, 1836-1866), who was the first to explain and justify, in this country, the importance of the threefold or "tripartite" division (Hamilton, *Lects. on Metaphysics*, xii. and xx.)

§ 6. *Three inseparable factors of mental life.*—The terms "classification" and "division" are commonly, but not accurately, used to indicate the threefold distinction to which we have referred; for this is a distinction of three factors which co-operate throughout the development of mind, and such words as "classification" suggest an arrangement of distinct things according to their likenesses and differences.

We can see how the three elements go together in the process of consciousness. (i) We never experience knowledge in the abstract, so to speak. Knowledge is always some individual's knowledge; and the mere experience of the knowledge as mine gives it a peculiar subjective tinge which we must designate feeling. Further, every cognitive process has at least a minimum of pleasure or pain connected with it; if not in itself specially pleasant or the reverse, then it is so because it is connected with what "interests" us. "Interest" is pleasurable excitement; or if it is the excitement of getting rid of something unpleasant, then it is pleasant in proportion to its success. And along with feeling, the knowing process also involves the conative or active side of the mind, if only in the shape of attention.) (ii) In affective processes, however predominant the feeling may be, as in strong emotion or passion, objects must be present involving intellectual elements which demand attention (a form

of conation). (iii) Similarly, in the conative process, we become mentally active because some change has taken place in our own ideas or in our perceived surroundings, and the change pleases or displeases us; thus with the active process occurs also the presentative and the affective. (iv) The three factors are mutually implicated also in the development of the mind. We shall see that no real mind could have advanced to the level of *perception* without the help of activity and feeling; the interests which lead to some impressions being attended to and retained, and others forgotten, rest on feeling; and, but for the activity thus prompted, the external world would not be what it is for us. Our experience, as we implied in the previous section, is *made* by us as much as it is *found* or *given*; and our selective interests are what make it.

For these and like reasons the three factors—knowledge, feeling, and conation—have been described as "partial constituents of one concrete whole"—that is, of any actual state of mind; and again, as "different aspects of one and the same process." But though they go together, any one of them may be "predominant" in comparison with the others; and this "predominance" of one factor may involve the comparative suppression or obscuration of the others. In some attitudes of mind, "reverie" or "meditation" mainly occupies us, when we seem passively to follow the play of our ideas. Impulse and feeling are really present, but only in slight intensity—*e.g.*, in the form of a disposition to go on thinking about something and so avoid mental vacuity. Reasonings and calculations that proceed without any particular difficulty appear in like

manner "passive," when they involve mental activity of small intensity. Exclusive attention to intellectual analysis may starve the emotions, or even in certain ways enfeeble the will:

> "And thus the native hue of resolution
> Is sicklied o'er with the pale cast of thought,
> And enterprises of great pitch and moment
> With this regard their currents turn awry,
> And lose the name of action."
>
> —*Hamlet*, Act III. sc. i.

On the other hand, emotion disturbs clear thinking. Spinoza inculcated thinking as a means of escaping from the passions: *think* the emotion, he said, analyse it, and you escape from it. Similarly, indulgence in emotion may be inimical to action; the mere "sentimentalist" indulges in grief for the sorrows of mankind, but this leads to nothing practical.

When we say that the three factors can be discerned in "any actual state of mind," there are certain limitations to be understood. These distinctions can only be made when the mind has attained a stage of development above that represented by the most primitive organisms. At the lowest level of mental life, there is no reason to believe that the threefold nature of conscious life can be said to exist. When we look at mind from the inside we find that the nearer we come to any state analogous to the beginning of conscious life, the nearer we come to a state in which there is no capacity for distinguishing objects,—a vague diffused state of consciousness which many writers call one of pure "feeling." This use of the term must be carefully distinguished from the meaning which we have given

to it in the previous sections, where it signifies at least the special qualities which we call "pleasantness" and "unpleasantness," either of which may belong to any mental process. But it is impossible to maintain that consciousness at its beginning or at any later stage consists of nothing but varying intensities of pleasure and pain. Whether the beginning of consciousness can be called "feeling," in a wider sense, is only a question of the language which it is most convenient to use. If it is to be called "feeling," we must remember that the feeling includes impulse. There is no known animal organism so undeveloped as to be capable only of "vegetative" functions (of merely assimilating nourishment) and incapable of movement through "irritability." Take, for instance, one of the simplest types of life, the genus *amœba*, species of which exist in most stagnant pools. It consists of nothing but a little mass of semifluid protoplasm containing a nucleus. It is capable of spontaneous movement, which consists in changing its shape and extending portions of its substance into armlike projections, which it again draws into itself. It absorbs and assimilates particles of food, which it dissolves. It multiplies by dividing into two (the nucleus dividing also), when each portion becomes a complete *amœba* like the original one. Now, we are not able to affirm positively that such a creature has any mental life at all; but the point is that if it has, these physiological characteristics suggest that it consists of a series of impulses. At whatever stage of physiological development we assume mental life to begin, we shall find physiological grounds suggesting that such mental life is active or impulsive.

The threefold scheme is very ably explained and de-

fended by Ward, *Psychological Principles*, ch. ii. Ward maintains that this analysis is applicable at every stage of mental life, where we always find a subject related to presentations through the feeling-prompted attention or action which the presentations arouse. For a discussion of the scientific utility of this scheme see Bradley, *Mind*, N.S., No. 33, "A Defence of Phenomenalism in Psychology," and Mellone, *Mind*, N.S., No. 39, "The Nature of Self-knowledge."

In his *Manual of Psychology* (bk. i., ch. i.) Professor G. F. Stout has explained the threefold scheme as we have set it forth above; but he usually lays out the topics of Analytic Psychology according to a modified form of the twofold division as proposed by Brentano: of this he has given a critical examination (*Analytic Psychology*, vol. i., bk. i.). In his *Groundwork of Psychology* (ch. iii.) he arranges this scheme as follows: (1) "cognition" (including "simple apprehension" and "judgment"), (2) "interest" (including "conation" and "feeling-attitude"). It must be admitted that there is a tendency at present to regard feeling as a phase of, or incident in, conative process. Other useful discussions of the threefold division of mind will be found in Höffding, *Outlines*, ch. iv., and Lotze, *Microcosmus*, vol. i., bk. ii., ch. ii.

Hamilton set the fashion of relying on a merely negative criterion for distinction of the ultimate elements in mind: *i.e.*, that a mental function is "ultimate" when it cannot be derived from any other, or from a common ground with any other. This is true of many constituents of mental life (*e.g.*, sensation and emotion) besides cognition, feeling, and will. When we say that these three are "ultimate," we mean that, apart from certain exceptional or limiting cases, they are the general modes necessary to constitute any concrete mental state; and this is not true of any other constituents of mental life.

We propose to treat the subject according to the threefold scheme, which seems to us the simplest for an elementary work. Whatever scheme we started from, we should have to follow one line at a time in exposition, when the facts run, so to speak, many lines

abreast. In the three following sections we shall mark out the point of view from which each of the three mental functions is regarded in this book.

§ 7. *Activity or Conation.*—We cannot give any account of mental activity without using the word "tendency": *a conscious process is active when it tends by its intrinsic nature to develop into something else.* The "something else" is the purpose or end. When we say that anything "tends" or "has a tendency," we mean (1) that, in the absence of outside hindrances, it will issue in a certain result, and (2) that it will maintain its own positive nature in and through the result. Thus "an acorn may be crushed into a shapeless mass, or it may grow into an oak. But we do not speak of it as having a tendency to be crushed into a shapeless mass, whereas we do naturally regard it as having a tendency to grow into an oak. The reason is that we consider it as maintaining its distinctive acorn nature in becoming an oak, but not in being crushed. The mental fact which we call Conation is a clear instance of tendency in the sense defined. In the process of attaining its end it is 'realised' or 'fulfilled,' instead of being destroyed or suppressed, and it always proceeds to the attainment of its end if, and so far as, other conditions permit."

Conation is an abstract term,[1] and therefore cannot be used in the plural. Just as the abstract term *humanity* stands for what is exemplified or typified in particular men, and consists of those qualities on account of which they are called human beings, so *conation* is exemplified in particular acts of Will or mental endeavour in the widest sense (including disposition, interest, want, wish, desire, impulse, attention). And since conation is an abstract term, we cannot do more than give a general

[1] Mellone, *Introductory Text-book of Logic*, ch. ii., §§ 2, 3.

indication of what it *means*; but in speaking of particular kinds of conation we are no longer dealing with this abstract characteristic alone, but with the particular kinds of mental endeavour in the concrete. When a conative process finds its satisfaction in *increased clearness and distinctness of modes of knowledge (perceptions or ideas)* it is called *attention.*

Conation may be more or less intense: thus, *attention* is always a matter of degree, whether in the simple form of attending to a perception or idea, or in concentrating the mind on one group of ideas to the exclusion of others that have presented themselves, or in reasoning out a problem the solution of which is not obvious, or in trying to remember something which will not "of itself" occur to the mind.

Finally, we must emphasise the fact that when we speak of knowledge or intellectual work being engaged in "for its own sake," this does not mean that feeling and conation are absent; it means only that feeling and conation are tending in a special way, and finding their satisfaction in intellectual, scientific, or theoretical aims.[1] It is important to remember that the "disinterested" pursuit of knowledge is a late product of mental development. At first theory exists only for the sake of practice; perception and knowledge are only a means of satisfying practical needs. The "embodied mind" must adapt itself to its environment, or its environment to itself, in order to maintain its existence there; and at first cognition is only a means by which this adaptation is made possible.

[1] Professor G. F. Stout has given a full explanation of the notion of mental activity in *Analytic Psychology*, vol. i., bk. ii., ch. I. Professor Ward's view of conation, as identical with attention and co-extensive with mental life, is set forth

in *Psychological Principles*, ch. ii. Bradley (*Appearance and Reality*, pp. 96-100, 603-607, 2nd edition; and in *Mind*, N.S., No. 40, "Some Remarks on Conation") criticises the conception of activity as applied to the mind, but in the end appears to accept it with limitations.

Professor Stout's view is that the process of conation is a *felt* or *immediately experienced* mental transition,—felt, whenever it occurs, as more or less intense, more or less effective, more or less free or constrained. The nature and limits of the "feeling" of activity give rise to an intricate and vexed question. We have seen that some—as, for instance, Professor Münsterberg—hold that the only activity which is *experienced* consists of muscular sensations. This is also the traditional view in British Psychology, and was maintained vigorously by Professor Bain. He, however, complicated the question by asserting a "sensation of innervation" as part of our muscular sensibility,—that is, a sensation specially corresponding to the efferent or outgoing nerve-current which innervates the muscle, and so causes the movement. This question cannot be held to be finally settled, but the balance of evidence is against Bain's view, which is entirely rejected, for example, by Professor James (*Principles of Psychology*, vol. i. pp. 296-305), who defends the opinion that our only experience of mental activity is of *afferent* muscular sensations. Afterwards (vol. ii. pp. 559-573) he rejects this explanation of activity, and affirms the reality of a purely mental act.

§ 8. *Feeling.*—The verb "feel" and the noun "feeling" have a variety of meanings in common language. Thus we should describe as "feelings" the following kinds of mental fact:—

(1) Pleasure and all kinds of pleasantness, pain and all kinds of unpleasantness;

(2) Organic sensations, such as hunger, fatigue, especially sensations indicating the healthy working (or the reverse) of the body and its various organs;

(3) Emotions, such as anger, fear, surprise, excitement;

(4) Sensations of touch and temperature.

We now ask whether these facts have in common any characteristic which we may suppose the term "feeling" to mark. The answer is in the affirmative. As "feelings" all these are psychologically *subjective* processes. What does this mean? It is very simple.

My ideas and my actions, though I know them as *mine*, have reference specially to the surrounding world; my "feelings," though usually aroused by objects, have reference in a special way to my *self* as distinct from the world and from other selves. My pleasure, pain, happiness, unhappiness, the pleasantness or unpleasantness with which events affect me, my emotional life, all point inwards to that *central source of conscious processes* which I call myself; and in thinking of my "feelings" I am thrown back upon myself in a more intimate way than when I attend to my ideas or actions. There are other processes, which involve this psychologically subjective element, and which common language speaks of as *felt*, though it would hesitate to describe them as *feelings*. Such are—desire, wish, impulse, interest, certainty, belief, doubt. The subjective quality is what common-sense marks by its use of the word *feel*.

We use "feeling," then, as an abstract term, to stand for the subjective quality which is exemplified in every real mental process. In this sense the word (like "conation") has no plural. If we speak of "a feeling" or of "feelings," we are referring not to the abstract subjective element by itself, but to the particular mental processes so named in ordinary language.

The subjective quality of mental facts shows itself or manifests itself in a special way. The mental fact, in

virtue of its relation to myself, is generally *pleasurable or painful* in some degree. Whenever we feel an organic sensation, an emotion, a desire, a wish, an impulse, an interest, a belief, a doubt, our feeling of it may rise towards pleasure or what is definitely agreeable, or fall towards pain or what is definitely disagreeable. Whenever, then, we abstract these qualities, pleasantness and unpleasantness, or consider them by themselves, we need an abstract term to stand for their varying degrees, just as "temperature" stands for the varying degrees of heat and cold. Ward and others use "feeling" as an abstract term, in the singular, for this purpose, and strictly limit it to this meaning. But it would seem that the subjective quality of mental processes does not consist only of pleasure and pain; and as we need the term "feeling" in other meanings, such a limitation is in any case very inconvenient.

A few remarks must be added on terminology. Our account of Feeling, as an abstract term, is substantially the same as the following, which has been proposed as a definition: "'Feeling' is consciousness as experiencing modifications abstracted (*a*) from the determination of objects, and (*b*) from the determination of actions." The term "affection" has been proposed for pleasantness or unpleasantness in the abstract. This is open to the objection that the word is used in common language in a much more limited sense; and in any case the technically wider use of the term has not been adopted by psychologists generally. Some writers—Professor G. F. Stout among them—prefer to use the term "feeling-tone."

We want a term which in psychology shall stand simply for pleasantness or unpleasantness by whatever conditions aroused, and which therefore shall be applicable to every mental process in its feeling-aspect. The terms "pleasure" and "pain" (in the singular) are in common use in psychology in the wide sense indicated above; but it cannot be said that a satisfactory term has been found to include both.

§ 9. *Knowing.*—Knowing, like feeling and conation, is a unique process, and therefore we can give no positive definition of it; we can only, so to speak, point to the process in operation.

If we consider any mental process whatever—*e.g.*, hoping, fearing, perceiving, remembering, desiring, we shall see that each one of them implies something which is hoped, feared, perceived, remembered, or desired. This something is called the *object* of the process. There is no difficulty in seeing the distinction between a mental process and its object,—between the process of attending and the thing that is attended to, between the process of desiring and the thing that is desired, and so on. In some cases the distinction is peculiarly obvious. We are in a questioning attitude of mind about the length of a room: but the room, the object, is not in a questioning state; it is *we* who are in doubt *about* it. The mental condition of questioning has characteristics of its own apart from those of its object. The distinction is equally obvious in the case of "desiring," "fearing," &c., and indeed in most of the cases mentioned above; and though not always so obvious, it holds throughout.

Now each of these processes is an actual state of mind; it is a concrete whole, and as such involves conation, feeling, and knowing. But only so far as we are able to *know* are we justified in speaking of an "object" at all. In order to get at the object, I must ask, for instance, *What* am I thinking about? *What* do I believe? *What* do I desire? And I am able to answer such questions just so far as I am able to *know*; so far as I do not *know*, there is no object present to me.

It is evident that objects are of many different kinds.

I may be thinking about a material object, as the table, —something imaginary, as the "unicorn,"—something ideal, as the immortality of the soul, or duty,—something scientific, as a geometrical figure, or a psychological topic,—or something practical, as the advice I am to give on a matter about which I am consulted: all these are *objects* if and so far as any one thinks of them. It is in this process that the psychology of knowledge is interested, and in the object only so far as it throws light on the process.

The processes in which we think of objects or come to know them have been called *presentations* by Professor Ward and a few other writers.

This term is thus used in a very wide sense. Ward also speaks of presentations as "objects"; this is a special psychological use of the term "object," but it may easily become misleading, for in the ordinary sense of the word objects are *presented*, but are not *presentations*. This process of *being presented* is what the psychology of cognition is interested in.

The only exception to the remark just made arises from the peculiar position which *sensations* hold from the psychological point of view. A sensation, as distinguished from other modes of knowledge, may be described as the simplest possible kind of knowing,—the consciousness of a comparatively simple quality, as "red" or "hot." The psychologist is not only concerned with the process by which such qualities come to be presented as objects; he is also concerned with their own independent being and nature. This has been well put by Professor Stout: "Hence the psychologist carefully distinguishes their varieties, classifies them, investigates their qualitive affinities and relations, and inquires into the conditions of their production. If he investigated spatial relations in this way, he would cease to be a psychologist and become a geometrician. But all that can be known about sensations it is the business of the psychologist to know."

CHAPTER V.

TYPES OF MENTAL ACTIVITY.

In the study of most sciences the best method is to begin with the simplest phenomena, and from them to proceed gradually to the more complex. In psychology, however, so far is this from being the case that it is hardly too much to say that the reverse is true. For the simple phenomena in psychology are rarely or never to be found in an adult mind—if indeed anywhere in nature,—hence they are highly abstract and difficult to grasp; whereas the complex phenomena present themselves daily, are concrete and familiar. For this reason, in psychological text-books written in accordance with the ordinary rules of scientific exposition, the easiest chapters are found at the end, and the hardest come at the beginning. Hence in this chapter we shall begin our study of mental activity by examining it as it is of daily occurrence in our own experience; we shall inquire how it is initiated and how it is directed; we shall consider the part played by habit and by interest; we shall discuss attention and the methods of securing it; we shall seek to define relatively to one another such terms as desire, need, impulse. We shall here confine ourselves to a con-

sideration of the mature mind, leaving to another chapter the task of showing how from the simple experience of the infant there develops the complex life which we find in ourselves.

§ 1. *Voluntary and ideo-motor action.*—When we begin to consider ourselves or others as persons, it is obvious to us that our importance as members of society consists most largely in our actions. It is indeed only through action that we can affect the outside world (*i.e.*, our physical environment or our fellow-men) at all. When we speak of a man's character, what we have primarily in view is the way he will act, or may be reasonably expected to act, in any given circumstances. The mental activity which precedes and accompanies the actual action or series of actions, like every concrete mental process, involves also a certain feeling and a certain knowledge. Thus (I determine to go for a walk.) Let us detain for a moment this state of mind which we call determination and examine it. It involves the idea of a walk gained from previous experience, for without such an idea clearly no such determination could be reached. It also involves an anticipation of enjoyment such as accompanied previous walks, and this gives a pleasing tone to my present state of mind. Thus knowledge and feeling are both involved, but in neither of these does the essence of the state consist, though it would, I suppose, be very difficult to make a being who was incapable of forming a determination understand exactly what else is required. The notion will have to be more particularly analysed hereafter. Meanwhile let the reader examine his own experience in any such state as that described above, and removing therefrom all that pertains to knowledge

and feeling, let him regard the residue as what we mean by activity.

In the case considered the mental state finds its culmination or satisfaction in bodily action: we rise and go. But such an outcome is not necessary. We may determine to stay where we are. Here the mind is active no less than before, but no bodily action follows. This non-fulfilment of the idea implies a more complex type of mind. The natural course of events is for the idea to pass into action. No sooner said than done, is a common phrase. No sooner thought of than done, describes a large part of our life. This ideo-motor action, as it is called, often happens so quickly that we are hardly aware of the presence of the idea before the action has taken place. Thus, when I am deeply engrossed in reading, to my astonishment my hand suddenly brushes across the page. I then perceive that a fly had settled there. At least this appears to me to be the order of events, though consideration shows that the action must follow upon the perception of the fly.[1]

The impulse to imitate, which is so powerful a factor in education, may be largely resolved into ideo-motor action. The example of another brings the idea before our mind in a singularly vivid and persistent form. It is in this way also that fashion rules her votaries.

So strong is the moving power of an idea that sometimes it will pass into action even against our own

[1] Of course the perception of the fly had not passed beyond the margin of consciousness, and probably never would have done so but for the more striking perception of the hand movement. In this section it will be noted that the word *idea* is used in a very general sense including thought or image and perception.

interests. Sir Henry Smith, ex-Commissioner of the City of London Police, said that, after the window-breaking in Pall Mall of the year 1886, he always, if danger threatened, had road-metal railed in and guarded, for the stones lying temptingly to hand had a fascination for the "rough" which he could not resist. It is not difficult to conceive that many ordinarily law-abiding citizens might easily be led to join in the "fun." Mob-action may largely be accounted for in this way. So also, without any desire to commit suicide, people have thrown themselves over precipices simply because the idea of so doing obsessed them. Similarly ideas often pass into spoken words without our wishing them to do so. It is related of Dr Almond of Loretto that, conversing once with a former pupil, he said, "I always considered you a remarkably fine example of the commercial mind." The former pupil was feeling rather pleased, when Dr Almond, thinking aloud, continued: "It is, of course, the lowest type of mind."

Now, are these ideo-motor acts to be regarded as voluntary? The instances given in the last paragraph would seem to determine this question in the negative. It is true that we are frequently ready to accept these actions, to identify ourselves with them subsequently, but the very fact that we also frequently repudiate them and declare they have taken place against our will shows that a pure ideo-motor act is not necessarily a voluntary act. In primitive people and in children the whole tendency of ideas is to pass into action. "My legs feel like running," said a boy. A younger child would not pause to observe the feeling. His legs would begin to run. In adults it is more difficult for a motor idea to run its course without interference, because numberless

tendencies and dispositions are ever, as it were, lying in wait to impede or further its course. Thus, when the idea of a walk arises, if our habit of work is strong, the idea of an unfinished task may rise in such force as to possess all consciousness, and drive the other altogether from the field. Even here the particular action which follows need not be voluntary; for certain ideas, as we have seen, possess a motive power of their own, and other things being equal, the strongest will win.

How much of our active life, then, does this term ideo-motor cover? The answer to this depends partly upon the exact significance which we attach to the term. Reflex actions, such as hiccough, sneezing, blushing, are of course to be classed separately, and indeed belong less to psychology than to physiology. Some writers distinguish also a type of action which they term "sensori-motor." Such acts would follow on "sensation" as ideo-motor acts follow on thought. The instinctive movements of the infant, such as grasping objects placed in the palm, or sucking anything placed between the lips, might be here included. It is somewhat difficult to find a simple example in adult life; but perhaps 1. our start on the occurrence of a loud noise or our swift 2. shrinking from a pin-prick may serve as examples of what is meant.

Acts which become habitual tend to sink from the ideo-motor to the sensori-motor class: in any train of action which through long practice has become automatic we seem to be guided by the sensations as they rise, although we cannot be said to have any idea in our minds of the movement which is to follow. Thus we cannot tell how we put on our clothes though we do it in the same way every morning, and we often find

that the only way in which we can teach a skilled movement (*e.g.*, tying a complicated knot) to another person is by *showing* him our actual performance of the series of movements required.

Professor James describes ideo-motor action thus: "Whenever movement follows, unhesitatingly and immediately, the notion of it in the mind, we have ideo-motor action" (*Principles of Psychology*, vol. ii. p. 522). The term is sometimes limited to actions which are non-voluntary or involuntary, but the better usage includes voluntary action in the ideo-motor class. In common usage we regard such actions as voluntary when the will identifies itself with them as they pass into action or after they have passed into action, as involuntary when it repudiates them.

If we now consider acts as they appear in relation to the will, we shall see that the following types may be distinguished:—

i. Voluntary action, consisting of (*a*) volitional action, consequent upon an express act of will following upon deliberation, (*b*) unvolitional or spontaneous action, which occurs in accordance with the dominant purpose of the time, but need not follow upon an express volition relating to that particular act.

ii. Non-voluntary action, performed in independence of the will—*e.g.*, reflex or automatic action.

iii. Involuntary action, opposed to the will, occurring in spite of a volition to the contrary (or of a volition which would have existed had there been time and opportunity to form it).

§ 2. *Voluntary action as deliberate choice.*—If a light is flashed in front of your eyes, your eyelids shut whether you will or no. You cannot prevent the movement. But if some one says to you, "Raise your arm," then you do so or not as you choose. This peculiar feeling of choice seems always to accompany volitional action.

It is important to realise that there are two kinds of

choice which in our ordinary thinking are often confused. When we hesitate between two courses of action our indecision is sometimes due to ignorance. Thus, in reading for an examination we may be in doubt which text-book to buy, yet we may be quite certain that the one we wish to buy is the one which follows most closely the traditional lines of our examination. We do choose here, and our action is evidently guided by our choice, but the choice is not one of the will, which has been decided from the outset. It is exclusively a determination of the intellect. The possibility of a volitional choice has not even risen in our mind, for all along we have had no thought beyond that of passing our examination.

But suppose we realise that the best text-book for the examination may not be the one best fitted to impart a thorough grasp of the subject, then we may have presented to us a genuine choice of the will. We respond to it by the decision: It is right for me to strive to know my subject thoroughly rather than merely to pass my examination,—at least, we do if our moral sense in matters intellectual has been cultivated; if not, we say, What care I for my subject so long as I can stir up enough dust to blind the Rhadamanthine eyes of my examiner? In either case our action follows in accordance with the decision, and by the decision we have made a standard for the will; the next time such a state of affairs arises we shall require to make only an intellectual choice, the principle of our choice being already determined. Thus a choice of will involves a choice between two ends; an intellectual choice is concerned only with the means to an end already adopted.[1]

[1] See A. F. Shand, *Foundations of Character*, bk. i., ch. vi.; and *Mind* (N.S.), No. 23.

As these standards in accordance with which we will to act are being fashioned in youth, it follows that youth or adolescence—when we begin to take our lives into our own hands—is pre-eminently the time for these choices of the will. In maturity a real choice of the will more rarely arises; our standards are relatively fixed—in other words, our character is set, and choice consists in determination by the intellect which of our possible courses of action accords with our settled principles.

It is important to be clear about those two modes of choice, for the difference is a momentous one. A volitional choice means a change, or at least a distinct step in the growth of character: an intellectual choice is a confirmation of the character already won. When Satan exclaims, "Evil, be thou my good," it is a volitional choice; and in thus accepting evil as his avowed end he makes a definite advance in the evolution of his character. When Coriolanus bends his proud revenge to his natural love for his mother, he makes a volitional choice which so alters his character that our sympathy goes forth to the arrogant man whose motive force had hitherto been but a low ambition. When Macbeth resolves on Duncan's murder, and so slays his honour on ambition's altar, he makes a volitional choice: when he decrees that Banquo too must perish, it is because his intellect decrees that only so can he retain his crown.

It is, of course, obvious that an intellectual decision may so define or modify our previous standard of action as to be in some degree volitional. Thus, when Brutus resolves upon the assassination of Cæsar, he decides that in the interests of patriotism even murder is justifiable. He might have qualified his patriotism otherwise and decided against the dreadful deed, but that his

decision is in the main an intellectual one is shown by the fact that after this base murder of his best friend his character does not deteriorate in the way that Macbeth's does.

From such examples as have been given, and also from a consideration of our own daily lives, it appears that volition in its highest and most complex form affects not so much single acts as courses of conduct. We are almost startled sometimes to realise how little volition explicitly enters into our daily lives. We are creatures of routine. We rise in the morning, eat our breakfast, go about our daily work, all as a matter of habit. Even our conversation is largely mechanical. We say what we have often said or have heard others say. We rarely pause to choose our words, or even to consider whether a thing is so or not. Many people, as they themselves allow, simply say "whatever comes into their heads"—ideo-motor action, nothing more. Many repeat the same stories in as nearly as possible the same words. And when voluntary decision does appear, it, as a rule, involves a whole series of events which are not in themselves determined voluntarily. Volition overleaps the means and hastens to the end. The means are for the most part relegated to habit. Let us suppose the question is whether I shall enter the university or go into business. Into many a man's life this question never enters as a choice; he is simply brought up with the one end in view or the other. Suppose, however, it is presented as a choice: then, what happens? I may have no hesitation; the attractions of the one course may to me far surpass those of the other. But suppose I hesitate. Then I proceed in this wise. I forecast my future in the two cases. I see myself as a successful business man and as the member of some

profession. I consider the different natures of the work I shall have to do. I ask myself which appeals most to me, which I am best suited for. The subject fills my mind, everything that happens seems to bear upon it, my whole being is in a turmoil, I can give my thoughts to nothing else. Then, often quite suddenly, I determine on one course or the other, and the tumult subsides. This decision involves a throwing of ourselves into the line selected, a dwelling upon its advantages, and a resolute turning away from the attractions possessed by the other, if, indeed, these attractions continue to be felt at all. Hence, Professor Stout finds that the distinguishing characteristics of a voluntary act is the entrance of self-consciousness as a co-operating factor: "I know what I am going to do." It is at such times that we peculiarly feel that we are not the mere sport of circumstance, but are free agents and masters of our fate.

Once our choice has been made we take the initial steps to carry it out, and these may involve a considerable amount of volitional action combined with choice; but once these preliminaries are over, our life moves once more on the rails laid down by habit and motor ideas. And, curiously enough, the more this is the case—that is, the less my volition now appears—the stronger is my character reckoned. If I continue to exercise my volition, if I have to decide every morning whether or not I will go to my classes or to my office, if I continue even to *feel* counter-attractions, I am reproached by myself and others as a weakling. In the mechanism of life does our strength lie. Here, indeed, it is he that is bound that is most truly free.

What has been said indicates at once the difference between *deliberate* and *impulsive* action. A deliberate act is one which is consciously brought into connection with

some general plan or purpose by which the impulses are controlled. An impulse is an isolated prompting. Among human beings, impulses pure and simple are best seen in cases of mental disorder. The craving for drink or opium may take the form of an irresistible impulse. In the case of the lower animals, whose mental life does not generally rise above the level of perception, action is impulsive. The feelings and acts which take place are prompted by perceptions, and are not connected into conscious general plans of action. The formation of such purposes requires a considerable development of the ideational life.

§ 3. *What is the "strongest" motive?*—In speaking above of ideo-motor action, we said that when two opposing ideas appeared in consciousness the strongest would win or express itself in action. So in the case of voluntary action, it is sometimes said that the strongest motives win. Now as this statement is sometimes used with great plausibility and ingenuity to support the mechanical view of human life, it is of the utmost importance that we should make clear to ourselves what it really means. If the statement were to be of the slightest scientific value, the motives in question would necessarily each have a definite motive power, but this is notoriously not the case. In the very process of examining them they shift and change in value, sometimes even ceasing to have any motive power at all. As a matter of fact, the statement is either untrue or a meaningless assertion of identity. If it signifies that the motives which were originally strongest win the day, it is clearly false. Thus, in the case imagined above, the idea of the wealth I shall gain as a man of business may be at first the strongest motive in consciousness, whereas in the course of my delibera-

tions it may become quite subordinate. If, on the other hand, it signifies that it is the motives which are finally strongest which win the day, then it is true, but at the same time valueless; for the whole difficulty lies in the very point ignored, and that is, how do these motives become the strongest? The answer is that in imagination I carry them on to their fulfilment, and compare myself as I should be in these circumstances with the self that I desire to be: if the two accord, the motive is strengthened; if they clash, then the motive is weakened or rejected.[1]

This is a difficult process involving intellectual insight. For, as is well known, motives attractive in themselves may be glossed so as to appear in harmony with others to which they are really opposed. Sometimes it is only when the deed is done, and the pleasure which we anticipated is in the past instead of the future, that the motives which actuated us stand revealed in their true colours. We are then able to brand as selfishness what we had thought was a high-minded love of art, or as a mean shrinking from the disagreeable what we had thought was an innate refinement of nature. Sometimes it is the opinion of others which grants us this revealing light, and we turn from our projected conduct with an utter revulsion of feeling. Often, however, the comparison takes place almost instantaneously, and we accept or

[1] It is, indeed, only as a matter of convenience that we talk of motives as if they had a continuous identity. The identity they possess is a mere identity of reference—*i.e.*, what we regard as the same motive persisting through time is a succession of motor ideas referring, roughly speaking, to the same object.

reject the proposed action as soon as we are aware of it. Again, the ideal self is so inwoven with our whole psychic life, that it not only rejects ideas from consciousness, but prevents their ever entering it. Thus, however much we may desire our friend's possessions, most of us never even think of stealing them.

The ideal self is thus a relatively constant motor idea. In saying this we do not of course imply that the ideal remains the same throughout life; the identity which belongs to it is of the same nature as that which belongs to the body. And it is to its power of development that it owes its permanent power as a motor idea, for its essential peculiarity is that it never works itself out: in other and more familiar words, our ideals are always in advance of our achievements,—our reach exceeds our grasp. The idea is often vague, even where it is strong; it is often not even self-consistent, as when we allow ourselves to do as members of a class what we would not do as private individuals. And, paradoxically enough, it is with this ill-defined, inconsistent, shifting ideal which we never are but only hope to be, which exists only in our imagination, that we identify ourselves most fully. When it is successful we feel that *we* are successful; when it is hindered or obstructed—as when Esau sold his birthright for a mess of pottage—we feel that *we* have been overcome by some hostile force. The building up and strengthening of this self is one of the most important problems of education. We must consider its genesis and growth more fully hereafter: meanwhile the conception will be rendered clear enough to every one by his own consciousness. It exists as a psychological disposition or sentiment

affecting conscious thought-processes, and having a determining influence on conduct generally. At a very early age, instinctive impulses are held up and as it were filtered through this sentiment, which thus acts in the interests of the unification of conduct, and in many cases takes its place as the central core of personality.

The ambiguities of the word "motive" have been notorious. In its widest sense it signifies any mental process determining, or contributing to the determination of, volition, including bodily feelings and unconscious dispositions. Professor G. Croom Robertson (*Philosophical Remains*, ed. Bain and Whittaker, p. 245-248) went so far as to say: "The word 'motive' may have a serviceable application in the popular view of man and the world, but has no scientific, which is to say here psychological, value whatever. . . . If so-called motives are not understood as definite mental states [which they are not] they are of no account for the psychological explanation of will." It seems unnecessary, however, to reject the term altogether. In the foregoing section we have used it to signify any *consciously purposive idea* entering into the determination of a voluntary act. T. H. Green, *Prolegomena to Ethics*, bk. ii., ch. i., expounds one form of this view, which really identifies "motive" with "desire" (see § 9 below).

The view which we have taken appears to be in substantial agreement with the following statement by Professor Stout (*Manual of Psychology*, bk. ii., ch. x.). "In the more developed forms of deliberation there is a kind of mental see-saw. Now one alternative, and now another, comes predominantly before consciousness, and the mind is variously attracted and repelled by each in turn. The desires and aversions which arise in this way are called Motives. Hence the process of deliberation is often called a Conflict of Motives. Motives are not mere impulses. They come before consciousness as reasons why *I* should

act in this or that way. They are not independent forces fighting out a battle among themselves, while the Ego remains a mere spectator. On the contrary, the motives are motives only in so far as they arise from the nature of the Self, and pre-suppose the conception of the Self as a determining factor. From this it follows that the recognised reasons for a decision can never constitute the entire cause of decision. Behind them there always lies the Self as a whole, and what this involves can never be completely analysed or stated in the form of definite reasons or special motives. While the process of deliberation is going on, the motives are motives for deciding: when the decision is made, the triumphant motives become motives for action. Or, to put the case in another way, while the process of deliberation is going on, the competing desires are regarded as possible motives for action: when the decision is formed, they become actual motives for action."

From the legal and practical point of view, the term can be given a useful working significance in harmony with the foregoing statements. Among the various objective results involved in a voluntary action, its motive is the result for *the sake of which* it was done. A burglar breaking into a house does so not for the sake of breaking windows or picking locks but for the sake of gaining possession of certain articles, and *this* is his motive.

§ 4. *Feeling of Effort.*—We have seen that our most typically voluntary acts, besides involving this reference to the self, are always attended by choice,—whether between two or more incompatible courses of conduct, or simply between acting and refraining from action. Many of them are attended also by that unique feature of our mental life—the feeling of effort. Here we seem to throw our weight, as it were, into the scale of the comparatively weak idea and carry it to its conclusion in spite of opposing ideas which are stronger in their own intrinsic nature. It is in such cases that we have the most convincing experience of ourselves as Agents.

Often when we are active physically or mentally—as when we walk or converse or let our thoughts wander—we can, if we are of an introspective turn of mind, feel ourselves merely passive. Our life flows on without our guidance or interference. But in the case of effort we are essentially actors,—we take the life-stream and direct its flow in the direction we desire.

Yet the self which intervenes in these cases cannot in the present state of our knowledge be conceived as a *deus ex machinâ*. It is influenced by many factors which we can express more easily in physiological than in psychical terms. Thus illness, fatigue, the digestive processes, all affect our power of producing effort. But to admit that the amount of effort which we can exert on any given occasion is partly regulated by circumstances which are not at that moment under our own control, is not to admit that the whole feeling of self-activity is an illusion. The former admission is indeed bound up in the very conception of growth, for growth simply means that we can do to-day what we could not do yesterday. Effort is thus a thing of degrees, but this does not prevent it being an essential attribute of humanity. We are not, as the extreme physicist would have us, simply whirlpools in the stream of universal life. We are rather to be likened to fountains of living water.

This action with effort is to many people an only too frequent fact of experience. Sometimes it may be trivial, as in Professor James's favourite example—the getting out of bed on a cold morning; sometimes it is momentous, as when Cranmer thrust his hand into the flames, or when Brutus doomed his sons to death. But what do such actions mean? In them we seem to be fighting, but the foe is within. We seem to be taking a difficult

way, but the difficulty is not in outward circumstances, —it is in ourselves and is part of ourselves.

> "The genius and the mortal instruments
> Are then in council, and the state of man
> Like to a little kingdom suffers then
> The nature of an insurrection."

In our endeavour to see clearly what in such cases is happening in "the state of man," there is a physiological conception which will greatly help us. This is the conception of different levels in the central nervous system—a conception which we owe to Dr Hughlings Jackson, who by his study of epilepsy was led to distinguish three different levels.[1] The cells of the lowest level receive stimuli from the periphery—*i.e.*, all tissue in which sensory nerves terminate—and they direct the response. The action may be diagrammatically represented thus:—

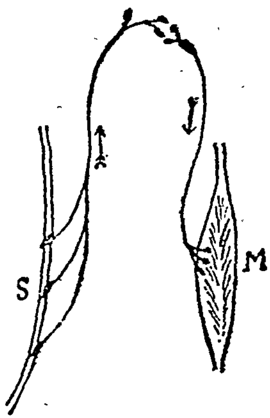

Fig. 2.

A feather tickles your throat at S (fig. 2); the irritation is conveyed along the sensory nerves to the cells concerned; rushing down to the larynx M comes the command to contract, and you cough. The diagram represents what is known as a reflex arc, and the nature of the nervous elements is such that every passage of a stimulus along this arc facilitates the passage of subsequent stimuli.

The cells of the second level do not communicate

[1] For a fuller account of the theory of different levels, see McDougall's *Physiological Psychology* in the "Temple Primers."

directly with the periphery at all; they receive news and issue their orders only through the cells of level 1: diagrammatically we figure it thus (fig. 3).

The cells of the special sense centres in the cortex belong to the second level. They form the apex of the sensori-motor arcs of the second level.

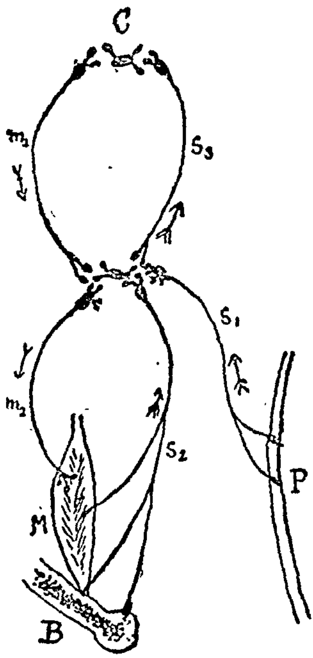

Fig. 3.

C, sensori-motor centre in cerebral cortex; P, periphery (skin, retina, &c.); M, muscle; B, bone; s_1, s_2, s_3, sensory nerves conducting stimuli towards the cerebral cortex; m_1, m_2, motor nerves conducting stimuli from the centres to the muscles; s_1, a nerve of special sensation; s_2, a nerve of kinæsthetic sensation (ch. vii., § 2).

The cells of level 3 have the same relation to the cells of level 2 as those have to the cells of level 1. To this third level belong the cells which function in the association of the information which reaches us by means of the special sense-organs (eye, ear, &c.), and also those cells which function in our highest and most abstract modes of thinking. Of course the levels may be more in number than three, but to the psychologist the number is of no importance in comparison with the principle. Microscopic investigation of the brain, so far as it has gone, lends support to this theory; but here the brute obstacles in the way of ascertaining the mere facts are

so great as to be inconceivable to any one who has not frequented a physiological laboratory.

The theory agrees well with the conclusions the psychologist has reached by his very different line of investigation: it even, as we have said, aids him to form a definite conception of what is taking place when action is accompanied by the feeling of effort.

We have seen that the cells of level 1 can of themselves direct the course of an automatic reaction such as a sneeze or a cough. But the stimulus which comes from the original irritation of the larynx not only (through the mediation of the cells) serves to direct the response, but also passes upward to the cells of the higher levels, and simultaneously with their entry into activity we become aware that we have an impulse to sneeze. Suppose we are in the position of Polonius behind the arras. The explosion in such circumstances would, we perceive, be in the highest degree inimical to our interests; and hastening down from the cells of the highest level through those of the lower and down to the muscular tissue comes the urgent contradictory command, Do not sneeze on any account.[1] We may succeed in restraining the impulse, or we may not. In the latter case we have an excellent example of an involuntary action—one taking place against our will. Had we been in a position to disregard noise, we should simply have allowed the reflex to run its course,—we should neither have hindered nor helped it, and we should have performed

[1] The student must be on his guard against supposing that these commands from the higher centres are merely inhibitory. The manner in which inhibition is effected is still a disputed question among physiologists.

a non-voluntary action,—one with which the will had nothing to do.

We said above that when an action takes place with effort we appear to ourselves to be fighting against an inward foe. We see now that this feeling of ours really represents the truth. In all such cases the most recently developed part of us—that most distinctively human—is for its own ends opposing some impulse which through the long course of evolution has become inwrought into the very fibres of our being. The first law of the organism is self-preservation. What of the man, then, who deliberately stands up to be fired at? He has consciously and voluntarily set up another end opposed to the elementary law of his organism, and he must expect to feel its endeavours to repel the outrage. Sometimes, it is true, the energy of the higher centres is such that the craving of the lower ones is unfelt: we embrace the flames that promise us a martyr's crown; we cast ourselves down in the ditch content if our bodies serve but as a bridge to help our comrades to victory. But such moments of excitement are rare: more frequently we feel it would be easier to let the higher centres relax and to drift as our lower nature would have us.

We often wonder why it is that trifles demand from us such an excess of effort. Why do we sometimes so hate to write a tiny note, when we will freely wear ourselves out attending on the sick-bed of a friend? Why do we stand and shiver on the brink of our cold morning bath when neither thunder, lightning, hail, nor rain will prevent our keeping our appointments? It is said that no man is a hero to his valet, and we cannot help feeling that Job had on the whole an easier time than his wife.

The explanation of these things lies in the fact that emotion has a powerful and widespread effect upon the muscular system.[1]

> "His strength was as the strength of ten,
> Because his heart was pure,"

is no more than a just tribute to the power of an indwelling passion for righteousness. The strength of an angry man is well known. Even Shylock's indignant sense of his wrongs makes him straighten his cringing figure and speak out like a man. The young fair Juliet braves the charnel-house itself in her desire for Romeo. Effortless is the power that does such high deeds. The whole nature of man is swept along in the full tide of living energy, and there is no faint heart to cry back. But when the emotion fades and our Titan purpose mocks us, a faint ghost of its former self, it is then that we need to call to mind Matthew Arnold's lines—

> "Tasks in hours of insight willed,
> Can be through hours of gloom fulfilled."

It is in these hours of gloom that effort appears, as we doggedly determine to see the thing through.

We see now why effort is so prominent in trifles. It is because we cannot draw on the sources of energy locked up in the emotions. It is hard for a matter-of-fact adult mind to find anything heroic in the morning plunge, or in the reluctant creeping out of bed; but the child, practical little psychologist that he is, knows how to overcome such hills of difficulty. The small boy eats his detested porridge without a murmur, because at the moment he is an intrepid explorer tortured by Indian chiefs, and he is too proud to give them even

[1] See ch. ix., § 5.

a grimace to rejoice over. The little girl swallows the bitter medicine almost with avidity, because her dolly has a cough which must be cured. When we can realise that the trifling matters wherein we so often take the easier path are really an integral part of a larger scheme of things, when we recognise that our ideal of our self is injured by every failure, then our whole self-feeling comes to our aid, and the struggle tends to disappear. In the same way a sudden interest will entirely prevent the feeling of effort arising; the shout of Fire and the smell of burning would bring the keenest bed-lover to his feet in an instant without any difficulty.

We have spoken above (§ 4) of the opposing impulses as emanating from nerve cells on different levels; but the student cannot too often remind himself that the whole meaning of the drama lies in the psychological dispositions which underlie and condition the action of the nerve cells. It is not a contest between two natural forces, as when friction brings a cannon-ball to rest; it is a contest between man's higher nature and his lower, and the story of how these come to be opposed is the story of evolution.

§ 5. *Action against the will.*—The contest is not, of course, always between our conscious self and an automatic or semi-automatic tendency. Frequently a strong impulse enters consciousness which yet we know we will not to carry out. Here are two examples from the records of Mr Holmes, the London police court missionary. A young man of respectable family who was forced by no need to dishonest courses, an allowance being made to him by his father, was brought before the magistrate for stealing a watch. Against him stood eight previous convictions for the same

offence. Here is his own account of the matter. "All I can tell you is that as I was going along the street and passing the jeweller's shop, something said to me, 'Go in and get a watch, go in and get a watch,' and I had to go in and get one." The second case is that of a woman who was constantly getting into trouble for stealing boots. Her piteous cry was, "Don't blame me, Mr Holmes, don't blame me; I can't help it: I would if I could, but I must steal boots." She wrote to Mr Holmes subsequently from the country, and in every letter boots were referred to; in one otherwise lucid she mentioned them, without much reason, four times. We all suffer occasionally from such morbid impulses in milder form. A longing to break something, to kick the chairs about, to laugh in church, will be felt by people of the most even self-command. Or a tune may haunt us, or some wretched jingle, such as Mark Twain's lines—

> "Punch, brother, punch with care,
> Punch in the presence of the passenjare,"

and we get peace from these demons only by allowing them to run their course,—by beating out the tune or finishing the rhyme.

In pathological cases, where the morbid impulse is criminal in nature, very frequently a voice urges its gratification. This symptom seems to indicate some failure in the adjustment of the relations between the nerve cells, and a *quasi* independent action on the part of some. Thus the "voice" is caused by illegitimate excitation of the sensory speech centre. The dissociations of personality which have of recent years attracted so much the attention of psychologists probably find their beginning in such a state as this.

Involuntary actions, then—actions opposed to the will,—may, it seems, occur in two ways. A contest may take place, and the involuntary impulse may prove so strong that the man gives in. Sometimes he himself, deplorably ignorant of the laws of his own mind, aids this consummation by dwelling upon the temptation—whether with longing or with loathing matters little, so long as he thus re-enforces the idea. This is often the case when a physical craving, as, for example, for drink or opium, is gratified. On the other hand, sometimes there is no contest, because our higher self is not aroused to a sense of what is passing until too late. The impulse rushes on to fulfilment, using, it may be, all the available energy of the brain in its course, as when the passion of anger possesses us; and we can only gaze regretfully at the deed which is done and say, "I did not *mean* to do it." Or, again, habit may have so eased the performance of the action that it is done before we think. Thus a mother may rub mustard on a child's thumbs to cure the unpleasant custom of sucking them; and again and again the thumbs will find their way to the child's lips, in spite of the fact that he knows an unpleasant taste will result.

We now add references for further study of the topics discussed in the previous sections. A complete list of references for the topics embraced under developed Volition would only bewilder the student. We select those which are calculated to be most useful to the English reader. The subject of developed volition is reviewed in a very instructive manner by Wundt, *Ethics* (Eng. trans.), vol. iii. ("Principles of Morality"), p. 3 ff.; see also Stout, *Manual*, bk. iv., ch. x., and in *Mind* (N.S.), vol. v. p. 354; and Ward, *Psychological Principles*, ch. xvi. Two very important references are: Bain, *Emotions and Will*, pt. ii., ch. vii., viii.; James, *Principles*, vol. ii., ch. xxvi. (especially "types of decision," p. 531; "mental effort," pp. 535 ff., 548; the "fiat," or state

of consciousness which exists at the moment of deciding between alternative courses of action, pp. 501, 526, 561, 568); more concisely in James, *Text-book of Psychology*, ch. xxvi. On Habit as a formative factor in character, see Bain, pt. ii., ch. ix.

On the connection between self-control and the efficiency of the higher nerve-centres, see Carpenter, *Mental Physiology*, bk. ii., ch. xvii., xviii.; and Ribot, *Diseases of the Will* (Eng. trans.), ch. i., ii.

With regard to the *freedom* of the Will, the following are the psychological questions that arise: (*a*) Does volition involve anything that can be called a *consciousness of* freedom? (*b*) In what sense can a voluntary act be called "free"? Both questions have given rise to much controversy, the nature of which will be evident from Bain, *Mental and Moral Science*, bk. iv., ch. xi. ("History of the Free-will Controversy"). "Consciousness of Freedom" has been defined as "consciousness that a decision arises from the self, and not from conditions in any way foreign to the self." "Freedom" has been ascribed to voluntary decisions in three senses: (*a*) that volition is free when, and so far as, it is due to the character and motives of the individual—because it is *his* action (as distinguished from actions due to the application of external force, or to physiological reflex); (*b*) that the free volition is in some way and to some extent independent of motives—being due to a self not entirely accounted for by character, motives, and circumstances; (*c*) that free action means action in accordance with reason, reason being thus regarded as a man's true self. Bain (*Emotions and Will*, pt. ii., ch. xi., § 9) disputes the applicability of either metaphor ("freedom" or "necessity") to volition; but his analysis naturally leads to the position (*a*); (*b*) is well represented by Martineau, *Study of Religion*, bk. iii., ch. ii., and James, vol. ii. pp. 569 ff.; (*c*) leads into the metaphysical aspects of the question (see Caird, *Critical Philosophy of Kant*, vol. ii., bk. ii., ch. iii.); in this sense "moral freedom" becomes an *ideal* to be aimed at, rather than an actual quality of human nature. In his *Introduction to Social Psychology*, ch. ix., Professor McDougall seems to adopt position (*a*); in his *Outline of Psychology*, pp. 447, 448, he appears to move towards position (*b*), in that he accepts the doctrine that man has "a certain creative power of original determination."

§ 6. *Habit.*—We proceed to describe a law of life which is perhaps the most fundamental, the most far-reaching, of all—namely, the law of habit. Numerous examples of the power of this property of our organism will occur to every reader. A well-worn story tells how, when a mischief-lover shouts "'Tenshun," the ex-soldier drops his pot of beer as his muscles involuntarily stiffen to the word of command. Miss Frances Power Cobbe sat in a room to write where she had sat and studied eight years before. She felt her feet moving restlessly under the table, and then remembered eight years before she always had a footstool. It was this the feet were seeking.[1]

Habit guides our rising and our retiring, our dressing and undressing, our eating and drinking—in fact, all the minor incidents of life. More than is commonly realised does habit guide both our emotions and our thinking. As Henry Sidgwick puts it—

> "We think so because all other people think so;
> Or because—or because—after all we do think so;
> Or because we were told so and think we must think so;
> Or because we once thought so and think we still think so;
> Or because, having thought so, we think we will think so."

Instances occur every day which show us how deeply habit is engrained in our nature. One morning after coming downstairs I found myself walking into a dark, low press. A moment's consideration brought to my mind the fact that some years ago I had been accustomed to enter this press every morning for my boots, and this habit, disused so long, had taken advantage of my attention being fixed on other matters to reassert itself. The reader is advised to note any similar instances of the revival of forgotten habits.

[1] Schofield, *The Unconscious Mind*, p. 248.

It is not difficult to form a fairly satisfactory conception of the physiological basis of habit. We have only to suppose that (when a neural excitation follows a certain course in the nervous system, it leaves behind it a "trace" which renders the same course easier for all subsequent nervous excitations.) When the trace has been very deeply worn by many repetitions of the action, two results follow: 1. It is very difficult for any stimulus which starts the series not to result in its completion: thus, if we play one piece of music very fluently, we should always have a certain difficulty in playing another which began with the same three bars, and the difficulty would occur at the point where the two series diverged. 2. The initial stimulus required to start the series diminishes to a minimum, as does likewise the attention necessary to sustain it in its course. Thus a skilled pianist can play a complicated piece of music and conduct a conversation at the same time. Many people can read aloud with an air of perfect intelligence without "taking in" a word of what they are reading. Here the sensori-motor arcs must be functioning actively, for every movement of the lips, every inflection of the voice, is guided by the visual sense impressions; nevertheless, it is a matter of everyday experience that the thoughts may be engaged on quite other matters.

To bring the physiological theory into accord with the facts of mental life, it is further necessary to suppose that the trace does not materially—if at all—facilitate the passage of the excitation in the reverse direction. We all know how easily we can rattle off the Lord's Prayer forwards; but to say it backwards requires the devil's aid.

Habitual actions have been called "secondarily auto-

matic"; it is clear that when they are fully established they approximate very closely to reflexes or series of reflexes, which are primarily automatic. But insomuch as they are *learned* in the life of the individual, they are to be found in all stages of progress towards complete automatism. During this process two changes take place in the mental life which accompanies the act: (1) the feeling of effort decreases, the action becomes *easier;* (2) attention gradually lapses—*i.e.*, the knowledge and the direction of the movements pass from the focus to the margin of consciousness. These two changes are so frequently experienced by us all that they scarcely require illustration: learning to walk, to cycle, to golf, to play the violin, are obvious examples. With the lapse of attention all idea of an end seems to disappear; hence people who withdraw their attention completely from their automatic movements often find themselves doing very ridiculous things. The story of the professor who, on coming into collision with a cow, removed his hat and exclaimed, "I beg your pardon, madam," is a case in point.

There is some reason to think that the very capacity to discriminate sensations is dependent on the power of the organism to form habits: it is through the progressive adaptation of the nervous system to the sense stimuli that differentiation arises. Thus habit is the foundation of all progress. Specific habits are in early life the stones out of which character is built. Were a child incapable of forming habits, of him indeed might the doom be pronounced, "Unstable as water, he shall not excel." Learning would be to him impossible, for every day would find him just where he was the day before. In later life, however, habit may lead to fossilisation, to loss of the capability for improvement, to dread and dis-

like of change. Movements may become so automatic that it is difficult to stop them. It is said that factory workers sometimes continue even in their sleep to move their fingers as they require to do in their work; and one of the chief functions of the "rest cure" is to teach people to relax those muscles which the habit of being ever "on the jump" causes them to keep in a state of constant tension. Modes of thought no less than modes of action are subject to habit. It has been said that the advance of science is due to a ceaseless struggle of the third and fourth decades against the fifth and sixth. Harvey himself, I believe, maintained that no one over forty accepted his doctrine of the circulation of the blood. For to change a habit, whether of thought or of conduct, is about as difficult as for the Ethiopian to change his skin. Not only is the organism less plastic, the lines of discharge more rigidly determined, but we have largely identified ourselves with our habits, and in altering them we feel we are mutilating ourselves. Thus Walter Bagehot says that the pain of a new idea is one of the greatest that man can suffer. "It is, as people say, so upsetting; it makes you think that, after all, your favourite notions may be wrong, your firmest beliefs ill-founded; it is certain that till now there was no place allotted in your mind to this new and startling inhabitant; and now that it has conquered an entrance, you do not at once see which of your old ideas it will not turn out, with which of them it can be reconciled, and with which it is at essential enmity."[1]

Among the British psychologists of the last century, a

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[1] Quoted from the Harveian Oration, 1906, by Professor Osler. *The Lancet*, Oct. 27, 1906.

remarkable contribution to the general psychology of Habit was made by Bain, *Emotions and Will*, pt. ii., ch. ix. The most brilliant and instructive work of recent years is that of James, *Principles*, vol. i., ch. iv. See also Stout, *Analytic Psychology*, vol. i., pp. 260 ff. Lloyd Morgan's *Habit and Instinct* gives interesting illustrations of the laws of habit in animal life. For other references relating to this subject, see ch. iv., § 4 above, and ch. viii., § 4 below. An acquired habit is a conspicuously familiar example of what is technically termed a "psychological disposition."

§ 7. *Interest.*—If Habit is, as appears to be the case, the conservative member of the Government of Everyman, Interest is the progressive. Interest is mainly concerned with what is new, habit with what is old. Some thinkers have identified interest with attention, but the word has certainly a richer connotation. If we consider it as an actual experience of the mind at the moment when it is being experienced, we find that it is indeed always accompanied by attention—generally by attention in very high degree. The greater the interest (whether painful or pleasurable) the greater the attention may be regarded as a self-evident truth. But the same cannot be said of the converse of this proposition—that attention is always accompanied by interest, nor is it universally true that the greater the attention the greater the interest. Thus we frequently give very great attention to matters—such as the adding up of figures—in which we feel very little interest, just because we know we have to get them done. A great deal of scientific work, such as the plotting of curves, the obtaining of averages, any process necessitating long periods of rather mechanical labour, is not accompanied

by interest. The feeling, however, flames up whenever any crucial point is reached; it has the effect usually of increasing attention, but sometimes becomes so intense as to defeat its own end and compel a cessation of the work, as when Newton, seeing a chance of his theory of gravitation being verified, became so excited that he was unable to finish his calculations.

Thus the variations in the intensity of the two processes, interest and attention, do not correspond, therefore some factor must affect one or both of them which does not affect the other in the same degree. This factor seems to us to be the relation which the object of the attention process is perceived to have to the self, the self being regarded as a more or less unified system of ends (see ch. xv.) When this relation sinks out of sight, as in lengthy calculations, interest is in abeyance; when it becomes prominent, as when some result which will repay us for years of toil seems near, then interest awakes. When the process appears to be working out in such a way as to further our ends, then the interest is pleasurable; when the opposite is the case the interest is painful. Thus any one who has a near relative in the regiment engaged will take in the account of a battle an interest which will almost certainly be painful, for his mind is full of the evil chances threatening the soldier whose life is bound up with his own. On the other hand, if, thanks to an optimistic disposition or to a belief in the soldier's lucky star, he has no fear for him, then his interest will be pleasurable, since he looks for his decoration or promotion.

In the case of painful interest care must be taken not to confuse instances where the means of satisfying the interest are repugnant with instances where the pain arises from the prospect of our ends being frustrated.

Thus the scientific interest may take to the dissecting-room a student whose dislike of this means of gaining the desired knowledge may be of the most violent nature. Here none the less the interest is itself pleasurable; the pleasure derived from its gratification is indeed so keen that it usually comes to counterbalance the disgust arising from the uncongenial nature of the surroundings.

But interest exists not only in this way as a more or less fleeting process; the term is used also to denote a comparatively stable condition or bias of the mind. We are said to possess interests; we say we are interested in psychology, in photography, in football, although at the moment we may be thinking of none of these, and besides these individual interests, which are more or less variable, we all as animals have certain organic interests, such as the safety of our bodies and the satisfaction of our needs. These permanent interests in adult life practically make up ourselves. If they were swept away we should be to all intents and purposes dead; and as a matter of fact even our bodies would soon perish, for we should give them neither food nor drink, nor remove them out of the way of danger.

The manner in which the systematised bodies of belief which make up our intellectual and distinctively human interests leap into consciousness to meet and welcome or reject any new element which is connected with them is one of the most striking and familiar phenomena of our active mentation. "I see they have had a message from the American Arctic Expedition." Immediately your polar exploration interest—if you have one—wakes, your consciousness fills with a turmoil of beliefs and vague notions relating to this subject; you fit the new information to the old knowledge, here altering the old to dovetail it to the new, there question-

ing the new as not according with the *old*; and the whole process is accompanied by a feeling of pleasurable excitement which we call *interest*. The events of the great war built up in every one a very sensitive interest—from which the newspapers were not slow to draw their profit. The organised "interests" or psychological dispositions formed in the minds of those who followed the course of events were kept in a constant state of subdued activity, so that the slightest stimulus, or indeed the mere want of any other pressing occupation, brought them into the focus of attention. The interest-feeling, when these topics did occupy the focus, was often painful in the extreme. We would gladly have avoided them, but they concerned us too nearly.

In all action which involves the nervous system it is safe to say that the magnitude of the effect is never dependent on the magnitude of the stimulus. Even in the case of reflex action a mere feather tickling the throat may produce a paroxysm which ends by affecting every muscle of the body. Parallel cases arise in consciousness in connection with our interests; it is a fact of the most ordinary experience that a very slight stimulus—sometimes the mere mention of a word—may create a mental turmoil that takes hours to subside. The fact that these interests are so sensitive to stimulation makes them in adult life the mainsprings of our action. The peculiarities of the attention process, which we consider below, render it impossible for them to exist continuously in consciousness; but they do seem, in the form of psychological dispositions, to be, in metaphorical language, constantly pressing upon consciousness, and they enter it whenever there is a momentary vacuum, or when a faint stimulus adds to their strength.

This characteristic of theirs is the real reason why we are justified in holding ourselves and others responsible for ideo-motor action, for in normal life an idea will rarely have sufficient strength to bring about an act unless it is strengthened from within by the stirring of these interest-complexes which have been built up in us by education and experience.

On interest as the *selective* function of consciousness, see James, *Principles*, vol. i., pp. 284-290, 402, 403, 572; vol. ii., pp. 344, 345 (more concisely in *Text-Book of Psychology*, ch. x.); Stout, *Analytic Psychology*, vol. i., bk. ii., ch. iii.; and *Groundwork of Psychology*, pp. 19, 55 (interest as an effective factor in mental development) and 221 (interests as differentiating into sentiments). A stimulating discussion of the fundamental questions involved will be found in Spearman, *Nature of Intelligence and Principles of Cognition*, ch. ix. ("Quantitative Principles").

§ 8. *Attention.*—The moment we think of this process we perceive that it has a very wide range of intensity. When we play a game of chess, work out an algebraical problem, take the bat for our county at a cricket match, we are attentive for a considerable time in the very highest degree. When the struggle is over, we have a distinct pleasurable sensation of released tension. The ordinary man reserves the word attention for cases of mental concentration such as these, but nearly the whole of our waking life is characterised by some degree of attention even when it sinks to a mere awareness of what is going on. In this wider sense the word becomes synonymous with mental activity; and a state of inattention is realised only when we are

dozing off to sleep or slowly waking. Words may then fall upon our ears, but their sense penetrates not; for to understand words we must construct their meaning ourselves; our eyes if open are fixed on vacancy; a diffused feeling of bodily comfort is faintly sensed. This form of inattention is almost purely negative, and is very different from that of which we often complain in children. When we say to them, You are inattentive, we commonly mean, You are attending to the wrong thing.

It is a characteristic of attention that it always has an object. This object may be (*a*) intellectual, as when we follow a train of abstract thought, or (*b*) sensorial, as when we watch a pair of birds building their nest, or (*c*) a combination of the two, as in a game of chess: in this last case the object is the game as a constructed unity in our minds, but this ideal construction is continuously based upon and modified by the sense impressions derived from the chessmen. The easiest form of attention is found in *b*, the most difficult in *a*. In the next chapter it will be shown that these facts have an important educational bearing.

A second general characteristic of attention is that it cannot remain fixed on one object unless that object develops. If you fix your attention on the ticking of a clock, you will be surprised to note that the sound is now louder, now lower; it comes in waves or pulses. This phenomenon is due to what has been fitly called the oscillation of attention. When we listen to a monotonous discourse or read a book which does not interest us, the same thing happens; our attention wanders to other matters, and has to be recalled again and again. On the other hand, when the object develops

in our minds—as when we work out a chess problem—we are not conscious of such oscillations; we seem capable of great and continuous concentration.[1]

Various attempts have been made to determine what has been called the span of attention, or to answer the question—To how many things can we attend at once? Thus some observers have sought to discover the number of things which can be distinguished by a single glance; for example, "Cards were ruled with short lines, varying in number from four to fifteen, and exposed to the eye for a hundredth of a second. When the number was but four or five, no mistakes as a rule were made. For higher numbers the tendency was to under- rather than to over-estimate. Similar experiments were tried with letters and figures, and gave the same result. When the letters formed familiar words, three times as many of them could be named as when their combination was meaningless. If the words formed a sentence, twice as many of them could be caught as when they had no connection."[2] Here, however, the so-called objects are all related as units in one total,—hence are clearly apprehended by a single act of attention. The experiment reveals not any shortcoming of attention, but the limitation of the sense organ. Other observers have tried the experiment of carrying on two processes at once,—for instance, writing one poem while reciting another. This device bears more nearly upon the question under discussion; but even here the two processes appear to be carried on not by a division of attention, but by its swift transference from one to the other. Thus the hand needs guidance

[1] On the "focus" and "margin" of consciousness, see ch. iii., § 3.

[2] Experiments by Mr J. M. Cattell, quoted by James, *Principles of Psychology*, vol. i. p. 407.

at the beginnings of the words or phrases; neural habit then enables it to continue unguided for a moment; and the same is the case with the voice. Should both need guidance at the same moment, one process or the other ceases. If the reader will but try one or two such experiments for himself, he will, we think, be convinced of the essential unity of the attention process. Would it be possible for any of us to solve an intricate geometrical problem and think out a theory of causation at one and the same time? Of course it is possible to conceive of beings able to follow simultaneously several chains of close reasoning and able to reproduce each in its entirety,—just as we are able to hear simultaneously several distinct series of sounds (such as the howling of the wind, the singing of a kettle, the sweeping of a floor, the rush of a river) and keep each as a separate series in our mind. But man's consciousness is not of this kind, and it appears to be the truth that when attention is at its height it is limited to one object.[1] This view of attention is supported by the well-known fact that concentration on one object implies the withdrawal of attention from others. Even severe pain may entirely disappear when we are deeply interested in something else.

Different varieties of Attention have been distinguished. These are—(1) Volitional, as in all cases where we are conscious of effort or difficulty. In such cases attention seems to consist in a series of endeavours to fix our mind on some topic which does not *in itself* interest us; our thoughts wander from it, and have to be constantly recalled. This process cannot be

[1] Of course the object is often very complex, as when we consider the state of the army or the situation in the Far East: the point to be insisted upon is that for the mind regarding it the object is one whole.

continued for long; unless our thought becomes tangled in the developments of the topic itself, and is borne along with it instead of constantly starting away from it, we shall do no profitable work. "There are topics known to every man from which he shies like a frightened horse, and which to get a glimpse of is to shun. Such are his ebbing assets to the spendthrift in full career. But why single out the spendthrift when to every man actuated by passion the thought of interests which negate the passion can hardly for more than a fleeting instant stay before the mind? It is like *memento mori* in the heyday of the pride of life. Nature rises at such suggestions, and excludes them from the view. How long, O healthy reader, can you now continue thinking of your tomb? In milder instances the difficulty is as great, especially when the brain is fagged. One snatches at any and every passing pretext, no matter how trivial or external, to escape from the odiousness of the matter in hand. I know a person, for example, who will poke the fire, set chairs straight, pick dust-specks from the floor, arrange his table, snatch up the newspaper, take down any book which catches his eye, trim his nails, waste the morning *anyhow*, in short, and all without premeditation,—simply because the only thing he ought to attend to is the preparation of a noonday lesson in formal logic which he detests. Anything but that!"[1]

Contrasted with this Volitional Attention is (2) Spontaneous Attention. This again may be either (*a*) Derived or (*b*) immediate. It is immediate when the object, whether it is a train of ideas or a sense stimulus, in itself commands attention; derived when the object is interesting, simply because of its connec-

[1] James, *Principles of Psychology*, vol. i. p. 421.

tion with other things that are so. In adult life the two species are usually mingled; thus in watching a play, the bright colours, the movement of the actors, the changes of scene, all arouse immediate attention; the comparison of the actors with others we have seen gives rise to derived attention. Volitional attention is always derived; for the very fact that effort is present is proof that the object is not interesting in itself, nevertheless it may and frequently does pass into spontaneous and even immediate attention, for the object may become interesting in its own right.

In considering the span of attention, we noticed in passing one remarkable result of its limitation, namely, that when attention is strongly concentrated on one thing, others that would ordinarily attract our notice pass unrecognised. In other words, the threshold of attention is raised, so that a stronger stimulus than usual is required to reach consciousness. Thus many people can read or write in the midst of a hum of conversation and not hear a word of it. A second remarkable effect of attention is the shortening of "reaction-time," or the time taken to respond to a stimulus. In games of skill, such as tennis, we all know the effect of being "off our guard"; we are slow in response and miss our stroke. We may even note that our play is better if we keep our mind fixed on our own reactions rather than on the course of the ball. That these differences in speed do actually exist has been proved by Wundt and others. Thus in one series of experiments in which the signal was the sound made by a ball falling on a board, the average reaction-time was .253 seconds, whereas when the release of the ball was so arranged as to give a warning signal the time sank to .076 seconds. In some subjects any distracting sensation, such as the playing of

an organ in the room where the experiments are being carried on, lengthens reaction-time. When the attention is directed to the response rather than to the signal, reaction-time is often (not always) shorter; and this even when an intellectual element is involved, as when the stimulus is variable and the experimenter has to vary his response accordingly.[1]

Whether the reaction-time is shortened or not, appears to depend on the individual. Dr Farrand, of Columbia University, in November 1896 examined two well-known pianists, Rosenthal and Sieveking, with a view to testing their reaction-time to sounds. Rosenthal, when asked regarding his attention, stated that it was entirely on the signal, and doubted if he could hold it on the reacting muscle. When he tried to do so the time of the reaction more than doubled, and the average variation in time more than quadrupled. Sieveking, on the contrary, maintained that his attention was fixed entirely on the reacting hand: when asked to fix it on the signal he soon declared it impossible, and declined to proceed. Professor Baldwin gives it as his opinion that so much evidence has now accumulated that the existence of types of simple reaction can no longer be ignored by any one.[2]

By attention the current of life is thus quickened, and this quickening is due to a preparation from within of the centres which are to give the response. They are kept in a state of subdued excitation, as are also the

[1] Thus Münsterberg made a series of experiments in which the reactor had to respond with a particular finger, according as a poet, a philosopher, a statesman, &c., was named. For an account of these experiments, see James, *Principles*, vol. ii. pp. 405-415.

[2] *Psychological Review*, vol. iv. p. 297. For a further account of other influences which affect reaction-time, see James, *Principles*, vol. i. pp. 85-97; Foster, *Text-book of Physiology*, pp. 1120-1124.

muscles themselves which are about to be used. This "preperception," as ideational preparation has been called, often has important perceptual results; for example, when a child, primed with ghost stories, enters a room in the dark, any white drapery will, down to the minutest detail, become the figure he dreads.

On the general psychology of Attention, see James, *Text-book of Psychology*, ch. iii. (also ch. xi., p. 170, on connection of attention with Interest; and ch. xxvi., p. 450, on connection with Volition), and Stout, *Manual*, bk. i., ch. i., § 4; bk. iii., ch. i., § 3; bk. iv., ch. x., § 11. These views are set forth in greater detail in James, *Principles*, vol. i., ch. xi.; vol. ii., ch. xxvi.; and Stout, *Analytic Psychology*, vol. i., bk. ii., ch. ii., iii. Ward, in his *Psychological Principles*, widens the meaning of the word "attention" so as to make it coextensive with mental life,—an extremely wide usage which has not found favour with other writers; but this does not affect the truth of his fundamental view that *the subject is essentially active in being conscious of presentations*. F. H. Bradley (*Mind*, O.S., vol. xi., pp. 305 ff.), in an important article "Is there any Special Activity of Attention?" eliminates the factor of attention as *activity*, and resolves the experience of intensifying attention into a group of sensational and ideational elements. In this he carries on the tradition of the empirical school in psychology. This general view will come under criticism in the sequel (below, ch. vii., § 10).

On the "area of attention," and the relation of simultaneous to successive attention, an early but still suggestive discussion will be found in Hamilton, *Lectures on Metaphysics*, Lects. xiii., xiv.; for more recent work, see James, vol. i., pp. 405 ff., and Ward, ch. iii., as above.

For an account of the Herbartian explanation of Attention, as consisting of the interaction of presentations, see Professor Stout's articles in *Mind*, O.S., vol. xiii.

§ 9. Closely allied to interest is *Desire*. In adult

life desire is sometimes experienced in a curious elementary form. We have an ill-defined sensation of want, a vague or blind craving,—blind because we do not know *what* we want. We say we wish something would happen; we sometimes take food or exercise or rest, but we do not *know* that we want any of these things; our efforts are merely experimental. The state is possibly due to fatigue or to over-stimulation of the nervous centres; but its importance to us at present is that it serves to illustrate the primitive form of desire. An analogous craving, though different in origin, seems to exist in infants; it is the need of the sense organs and the muscles to be used, to be stimulated. In its more developed forms desire is always connected with an end. We shall be led in the next chapter to lay stress on growth as a fundamental characteristic of the human self: our interests are in their nature incomplete or unsatisfied, our bodily needs are recurrent, pleasures which are continuous pall, and may even become painful (*e.g.*, a never-changing blue sky), and it is out of this sense of incompleteness that there arises desire.

Desire is a striving towards, aversion, its negative correlate, a striving away from; desire refers to the future, aversion commonly to the present; both generally cease with the attainment of their ends. If the end of desire is a certain state, then with the attainment of the state desire appears to cease; yet the displeasure felt at an interruption will often reveal to us that in the form of felt tendency it was still strongly present. An example will make this clear. During the latter part of a long walk we may eagerly look forward to the pleasures of rest; when we throw ourselves down on a sofa, we cease to be aware of any longing, and give ourselves wholly up to enjoyment, but if we are summoned to do anything

we at once become conscious that desire is still present in the shape of an undefined longing for the continuance of our pleasurable state.

Professor Stout identifies aversion with enforced attention. The dislike which many people have to noise is an obvious example. In the obstruction of a process of thought or of action, which is moving in accordance with our wishes, either by an incompatible idea or by a physical obstacle, we have an analogous experience. The dislike felt for the unwelcome suggestion is often extended to the person making it, as when King Lear's anger flames up against Kent for seeking to stop him in his headstrong course. In such cases the enforcement of attention is due to the fact that there is a process actually going on in the mind which is impeded. Thus to go back to James's words quoted above, you refuse to contemplate your tomb because you view it as the terminus of your many lines of activity. When these are not dominant in your mind, it is quite possible for you actually to enjoy such contemplation as you dwell on the pleasing sorrow of your friends. In China a coffin is regarded as a very pleasing and appropriate birthday gift.

The question has often been raised whether we feel desire for certain things and aversion for others because we represent them as pleasurable and painful respectively; in other words, whether pleasure and pain are the exclusive determining factors of our desires and aversions. It is evident that in adult life the element of personal pleasure in the end desired sinks almost entirely into the background. The fact that pleasure does generally accompany the end desired is no proof that it was for that pleasure that we made it an end. Indeed the very perception that we have accomplished

what we set ourselves to do itself gives rise to pleasure; but it would be absurd to say that it was for the sake of this pleasure that we set ourselves the task.

In *desire*, in the strict sense of the word, we have an idea of the purpose to be realised and ideas of the means. Professor Ward has brought this out very clearly. "The cases in which we are incited to action by ideas, as distinct from perceptions, are cases of desire. . . . By the time that ideas are sufficiently self-sustaining, they form trains that are not wholly shaped by the circumstances of the present; entirely new possibilities of action are opened up. We can desire to live again through experiences of which there is nothing actually present to remind us; and we can desire a new experience which as yet we only imagine" (*Psychological Principles*, ch. xi., § 3). See also Stout, *Analytic Psychology*, vol. i., bk. i., ch. vi. On the relation of pleasure and pain to the active element in desire and aversion, see below, ch. x. Green, *Prolegomena to Ethics*, bk. ii., ch. ii., expounds the view that desires are forms in which the self tends to realise itself—*i.e.*, in which its general process of growth tends to take definite shape. On the relation of pleasure to the object of desire, see Sidgwick, *Methods of Ethics*, bk. i., ch. iv.

CHAPTER VI.

ORGANIC SENSATIONS AND IMPULSES.

§ 1. *Conditions of organic sensation.*—Man is a psycho-physical organism. The same may be said probably of every living thing. But the higher we ascend in the scale of life the greater is the content of the first part of the word "psycho-physical." We cannot, however, say that the content of the latter part decreases. On the contrary, man's physical life is enormously more complex than that of other animals, and its effect on his mental experience must by no means be under-estimated. Organic sensations, or internal sensations, which are intimately bound up with, and correspond closely to, changes in the activity of the internal organs of the body, are always entering into and affecting an inner experience, just because the mind is always an embodied mind. To understand all the parts which they play in mental life would be to answer the question—at present unanswerable—"Why the mind has a body." The consideration of the organic sensations is best approached from the physiological side.

Organic sensations are so called, first of all in broad distinction from external sensations, *i.e.*, sensations of sight, hearing, taste, smell, and touch (temperature and pressure). We say "broad" distinction, because there

is no clear line of division between organic and external sensations; there is a borderland. An external sensation is a conscious process aroused by the present operation of an external stimulus on the nervous system. The external sensations are the beginnings of information about our surroundings; their natural result is an intellectual attitude expressed in the query, "What is this that affects my senses?" The stimuli which arouse organic sensations are physiological processes within the organism.

In earlier editions of this book "organic sensations" were classed under the head of "sense-feelings." In this edition, in order not to break with general usage, the traditional terminology has been followed: although, as a matter of fact, the psychological characteristics of these "sensations" are more akin to those of feeling or impulse than to those of the sensations connected with the special senses. The most obvious and striking fact about our organic sensations is that we cannot distinguish (*a*) an affective and (*b*) a presentative element, as we can in the case of a "pleasant" *colour* or an "unpleasant" *sound*. Some psychologists say that we find the presentative element in certain temporal and spatial characteristics by which we distinguish one kind of such feelings from another. It is quite true that these feelings have characteristics other than those of mere intensity; they are assigned (as we have seen) to different parts of the body, or localised; they may vary in duration and in temporal sequence or rhythmic alternation ("throbbing," "beating," &c.) and in local distribution ("piercing," "pricking," &c.). But these presentational elements—if such they can be called—in the feeling *afford us no knowledge* other than to enable us to express the difference between one kind of feeling and another. We may put it thus: an organic "sensation" is the *feeling* of an *organic need*, or of an activity satisfying an organic need; hence these "sensations" tend to pass into *impulses*.

It has been truly said that feeling in its lower forms does not seem to follow or depend on presentative elements; the

initial phase arising out of organic sensation is distinctly one of feeling.

Has the reader realised what an almost inconceivably complex thing his living body is? Some of the great foundations of this complex structure are easily noticed even by the unscientific eye. Such are,—the organs of respiration, by which the outer air is brought into connection with the blood,—the organs of nutrition, by which food and drink are assimilated,—the organs of circulation (the "beating" of the heart and the alternate expansion and contraction of the blood-vessels),—the organs by which human beings are able to reproduce their kind; but these are only some of the principal factors in one indefinitely complex process of upbuilding and down-wearing changes, which are always going on in every part of the bodily economy. We say, of *one* complex process: for all these various processes work together to form one living whole; they belong together more intimately than the parts of the most delicately constructed machine; their unity is as intense as their variety is great. It is of the processes embraced in this unity that we are thinking when we say that organic sensations are those which directly correspond to the various changes in the internal organs. Connected with nearly all these organs are sensory nerves capable of conveying multitudinous impressions from all parts of the body to the central nervous system.

What, then, should we expect to find, corresponding to all this, on the mental side?

Distinguishable varieties of sensation exist, corresponding to these various processes, so far as sensation is required to indicate an organic need. "Movements

of the viscera [internal organs]," says Dr C. Mercier, "that do not discharge their contents externally have no accompanying sensation. No useful purpose could be served by the acquisition of such a sensation, and therefore no such sensation has been acquired. Had it been as important to the welfare of the individual to be aware of the distension and emptying of his gall-bladder as of the distension and emptying of his urinary bladder, no doubt the sensations accompanying these conditions in the one would have been as vivid as in the case of the other. So, again, in turning the eye to the light, we have no sensation of the closing in of the pupil to shut out the glare; none is needed." Hence there are a vast number of factors contributing to the bodily life—and some of them most important factors, as the secretions of the glands,[1]—which, in a healthy state, go on with a minimum of accompanying sensation. In a healthy state; for, as Professor J. Jastrow has well put it, "in health these functions conduct themselves invisibly, silently, imperceptibly, like well-trained servants. But when the delicate balance of one or other of these functions is interfered with, all sorts of sensations, more or less vaguely localised and indefinitely realised and difficult to describe, but all variously unpleasant, make themselves felt. . . . There seems established within the body provision for rare and unusual forms of feeling in connection with disturbance of function, along with a serviceable apportionment of consciousness among the normally functioning activities."[2]

§ 2. *General vital feeling.*—We should expect to find—at the bottom of consciousness, so to speak, and

[1] For note on the far-reaching effect of such secretions on mental life, see above, p. 71.

[2] Jastrow, *The Subconscious*, pp. 10, 11.

distinct from the feelings of the particular processes in the body—a vague and diffused but very real feeling corresponding to the changes in the course of *bodily life as a whole* from moment to moment,—its more or less harmonious or impeded progress, and the more or less successful *co-operation* of its various factors. It is noteworthy that the central nervous system is not only affected by the sensory nerves (referred to in the previous section) from the various internal organs, but is directly affected by the general state of the body, and especially by the character and quantity of the blood supply. Hence the multitude of bodily processes which are not each (in health) accompanied by distinctly appreciable sensations, do none the less contribute a total experience which gives a "tone" or "mood" to our whole consciousness. It is a massive diffused experience, which may be described as the "feeling of bodily life," varying as "health," "comfort," "briskness," "general fatigue." One of its pleasantest forms is the reaction of a vigorous body after exercise, or the tonic that comes of "bracing air"; examples of its more unpleasant forms are feeling "out of sorts," "run down," or "ill," without being able to assign the trouble to any particular part. This general vital feeling is variously described as "common sensibility" or *coenæsthesis* (German *Gemeingefühl*).

The various distinguishable organic feelings appear to *arise out of* this general vital feeling, or to differentiate themselves from it; it is, so to speak, a sea of which they are distinct waves. Some bodily processes are more intimately instrumental or organic to bodily life than others; hence the feelings attending the former are naturally less differentiated from the vital feeling

than those attending the latter. But since all the bodily functions—including those of the external sense-organs—are in some degree instrumental to bodily life, no one of these feelings is completely differentiated from the vital feeling, but seems to have it for a background. Thus the muscular feelings are merged in the vital feeling when the movement is one which is essential to life—as in the case of the lungs or the heart. They are more distinct from the vital feeling when the movement is less immediately necessary to the continuance of life—as in the case of movements of the eyes, vocal organs, limbs, and head.

These facts are illustrated, for example, in the case of the organic sensations connected with respiration. Respiration is inhalation of oxygen into the lungs and its chemical combination with the red corpuscles of the blood. The healthy action of the lungs is merged in the common vital feeling. But their action may arouse a characteristic organic sensation, felt in an intense form in "suffocation," which is due to want of oxygen, from whatever cause arising. This is, in the literal sense of the word, an *unbearable* feeling. A similar feeling, but far less intense, arises from impure air—*e.g.*, on entering a crowded room.

Differences in coenæsthesis are probably largely responsible for the immense range of individual differences, which we embrace under the term temperament. The coenæsthesis is of course always varying; but in some people the variation may be extraordinarily sudden and extraordinarily violent. Such changes may be examples of the *summation of stimuli*, an expression used to call attention to the fact that faint stimuli too weak to arouse consciousness of their presence may

by simple persistence at last break down the barricade, and when they have won attention may be perceived as of great moment—not as faint but as strong.

The following observations will serve to make the point clear. The cases, which are notable examples of the sudden onset of influenza, are recorded by Sir Clifford Allbutt. "The first case," he says, "was sent me by Dr Dawson Williams. It occurred in a gentleman who, when working in his garden, was called in to tea: he turned to go in, but as he did so, was seized with a sense of prostration so utter that he could hardly crawl to the window, and he crossed its threshold only to sink exhausted into his arm-chair. The second, which was narrated to me by Dr Cane, of Edmonton, was even more remarkable, as a feature of the onset was a sudden assault on the mind. This victim, when attacked, was at a railway station, in the full sense of wellbeing and happiness, when so sudden a stroke of misery befell him that he had to implore his companion to carry him into the waiting-room, and to detain him there forcibly, lest he should seek destruction by throwing himself under a passing train. And the misery may as suddenly vanish. Of such recoveries, Sir William Church told me that after weeks of depression, and while going about his work in a doleful, perfunctory spirit, the patient bethought himself, almost in a moment, that afternoon tea would be very welcome, and promptly welcome it was: it tasted delicious, and the enjoyment of it was the prelude, or rather the fulfilment, of release from his despondency."

§ 3. *Muscular exertion.*—When the muscles contract in moving a limb, several physiological factors contribute to the conscious experience: the strain in the

muscle itself and in the tendons, the flexion, &c., of the skin, the sliding of the joints: these all contribute to what is called muscular sensation. How these affect us, as regards pleasure and pain, depends not only on the organs themselves but on the general condition of the body. Muscular exertion, after rest and nourishment, is always pleasant; a period of indifference ensues, which may (according to the constitution of the person and the nature of the movements) be almost indefinitely prolonged; on the other hand, the continued exertion may soon become increasingly painful. Exercise in the discharge of surplus energy is an important source of bodily pleasure; so is the condition of muscular repose after ordinary fatigue. All these feelings are complicated with others, due to what we may call the *diffusion of bodily effects.*

This diffusion is due not only to affection of the nervous system by stimuli originating in the muscles, but also to the effects on the blood-stream of muscular exertion. Like all other organs of the body, the muscles are built up of cellular units. The muscle cells by means of their contractility serve as the mechanical engines of the body. From the blood-stream they obtain the substances necessary for their work, and into the blood-stream they empty their waste products. Such vitiated blood becomes itself a cause of fatigue. If blood is taken from an animal in a fatigued condition and injected into an animal that is fresh, the second animal will exhibit signs of fatigue.

Certain sensations derived from the muscles form a special "sense," and are considered along with the other "external" sensations. Organic muscular sensations include sensations of muscular fatigue and repose, and of muscular injury. Under this head we may

refer to the example of *cramp* (which is also a typical example of an intense organic sensation). This feeling, which is usually extremely painful, is aroused by the spasmodic contraction of one or more muscles, due to some abnormal irritation of the nerves attached to them. It is only too familiar to experienced swimmers, being sometimes brought on by exposure of the limbs to cold. Dr J. O. Affleck thus describes the experience: "In its most intense form, that of cramp in the limbs, this disorder comes on suddenly, often during sleep, the patient being aroused by an agonising feeling of pain in the calf of the leg or the back of the thigh, accompanied in many instances with a sensation of sickness or faintness from the intensity of the suffering [an example of the diffusion of effects]; during the paroxysm the muscular fibres can often be felt gathered up into a hard knot." In the severe pains due to laceration or other injury to the muscles, the diffused effects, which complicate, extend, and intensify the feeling, often embrace the involuntary muscles and glands (as in the production of violent sobbing), the skin, the heart, the lungs, and other organs.

§ 4. *Fatigue.*—Fatigue is such a universal experience, and such an important factor in our industrial life, that a great deal of time and ingenuity has been devoted to its study. A pioneer in this work was Angelo Mosso, Professor of Physiology in the University of Turin, and the inventor of the ergograph, a machine designed to obtain a record of the onset of fatigue in a muscle. Such a record or "ergogram" is produced in the following way. The observer places his right forearm on a horizontal board to which it is clamped; the first and third fingers are inserted in metal stoles, the middle finger is free to bend; round the middle finger passes a loop

from which a cord with a weight hanging to it passes over a pulley; when the finger bends the weight is raised; by means of a stylus attached to the string, and resting its point on a revolving smoked drum, it is easy to obtain a series of lines the sum of which equals the total distance through which the weight has been raised by the exertion of the finger muscles. It has been found that if the weight is not too heavy, and if the pause between successive contractions is sufficiently long, work can be continued indefinitely with no diminution in the amount of each contraction; with heavier weights or shorter pauses the contractions diminish with greater or less rapidity, and in a short time cease altogether. Mosso found that the ergograms are highly individual, each person apparently having his own characteristic way of fatiguing. One of the most striking results of the experimental work done in Professor Mosso's laboratory bears on the relation between the amount of work done and the rest period necessary for complete recuperation. Suppose thirty contractions exhaust a muscle relatively to a particular weight; it is quite evident from the nature of the curve that more than half of the total work done is done by the first fifteen contractions. In spite of this it was found that the rest period required for complete recovery of the muscles after the first fifteen contractions was only a quarter of that required after the muscle had been worked to the point of exhaustion. Thus not only can a fatigued muscle do less work, but in doing that work it receives greater injury.[1]

In the application of these findings to industry noteworthy evidence of the practical value of Mosso's work

[1] Mosso, *Fatigue* (Eng. tr.), p. 151.

has been obtained. We give one example. Five hundred shovellers were "employed in shovelling, with a shovel of constant size, material of very varying weight, sometimes coal, sometimes ashes, at other times heavy iron ore, &c. Experiments were conducted with shovels of different sizes in order to ascertain the optimal weight per shovel load for a good shoveller. The best average weight was found to be 21 lbs. Accordingly shovels were made of different sizes, in proportion to the heaviness of the material shovelled, so that each shovel, whether full of coal, ash or iron, &c., weighed 21 lbs. This was the most important innovation, although others were at the same time carried out. The results were as follows: (i) the average amount shovelled per day rose by nearly 270 per cent—from 16 to 59 tons per man; (ii) 150 men could now perform what 500 men had performed under previous conditions; (iii) the average earnings of the shovellers increased by 60 per cent; (iv) the cost to the management, after paying all extra expenses, was reduced by 50 per cent; (v) there was no evidence of increased fatigue of the shovellers."[1]

Professor Mosso also investigated the effect of intellectual work on the ergogram. He found that in some subjects intellectual work increased muscular power, which increase was followed by more or less rapid diminution; in others the stage of decreased work set in at once.

It is clear that we can obtain a work curve in a great variety of ways. Any mode of working that lends itself to measurement can be used. The continuous multiplication or addition of numbers, the stroking out of certain selected letters from pages of prepared material,

[1] C. S. Myers, *Present-Day Applications of Psychology*, pp. 9, 10.

or other evenly toned intellectual activities can be carried on for long periods, marks being inserted to show how much work is done in equal periods of time. From the data thus obtained the work curve can be constructed. Kraepelin and his pupils devoted much time to the construction and study of such curves, paying special attention to the effect of rest pauses of very varying duration. The effect of the pause varies according to the nature and the duration of the work. One investigator found that a rest of fifteen minutes after working at addition for an hour augments the capacity for work, while a rest of the same duration after working for half-an-hour has an unfavourable effect. In these curves the first part often shows increasing production; this is the period of warming up; the increase is due to practice and habituation; thereafter we may have a stationary period during which no falling off is perceptible; then follows a period during which in spite of our best efforts there is always diminution; here fatigue overcomes the effects of practice. A psychic stimulus, such as the announcement that work will cease in two minutes, may effect an increase in the output said to be due to a "spurt."

This leads us to the important distinction between *objective and subjective fatigue.* Objective fatigue is shown by the diminished output resulting from work. Subjective fatigue may be otherwise described as the psychological factor in the case, tending to accentuate or diminish the degree to which fatigue is felt and admitted in the course of or after exertion. The power of music to quicken the lagging steps of tired soldiers; the influence of the emotions in redoubling one's strength; the driving force of exhortation, or promised reward, are well-known examples of the way in which feeling of fatigue may be reduced. In "boredom" we

have something like an illusion of fatigue, due to lack of interest in what is being done. Here we can trace, in varying forms, the power of suggestion. In an experimental work curve, for instance, in the case of some persons, the assurance that a weight has been diminished enables a muscle apparently exhausted relatively to that weight to raise it once more. How far these subjective suggestions actually make a change in the physical condition of the individual, is evidently a special case of the question, "How far the mind under special conditions can influence the body" (see above, ch. ii., § 8).

With regard to all the factors mentioned, we find that individual differences are very great. Some people feel fatigue when their output of work shows no sign of diminution. Others again deny fatigue even when their output is sensibly lessened.

Normally a feeling of fatigue indicates a call for rest on the part of nature. When one begins to feel tired, the mind is more or less impressed with this fact. And the continued consciousness of fatigue intensifies the feeling to a greater or less degree depending on the suggestibility of the individual. In some persons this factor may play the greatest part in the production of the symptom, so that slight muscular fatigue produces a feeling as of serious exhaustion; while in others, determination of purpose or interest in work may engender a disregard or an *anæsthesia* for the symptom, which enables them to do great quantities of work with little felt discomfort. It is to this latter class that William James refers in his well-known Essay on "The Energies of Men," in which he urges us to "break through the zone of fatigue," and uses the metaphor of the "second wind" in

racing. The advice is salutary for people who are liable to be supersensitive to the symptoms of fatigue (fatigue *hyperæsthesia*); whether it is equally sound for people capable of fatigue *anæsthesia*, is a very different question.

See Myers, *Present-day Applications of Psychology* (1918), a booklet full of instructive information; and the same writer's *Mind and Work* (1920) and *Text-Book of Experimental Psychology*, 3rd ed., vol. i., ch. xiv.; also Muscio, *Lectures on Industrial Psychology* (Sydney, 1920), and "Is a Fatigue Test Possible," in *British Journal of Psychology*, vol. xii., 1922.

§ 5. *Sleep.*—An ancient Greek thinker observed that "to those who are awake there is one world in common, but of those who are asleep each is withdrawn into a private world of his own." This profoundly suggestive remark simply defines the problem on which recent investigation of the psychology of sleep has been concentrated. In waking life each of us lives a life bound up with the common existence of other human beings with whom he is grouped in the outer world; during sleep each of us is buried in his own world, and tendencies of which we were unconscious when awake—tendencies that may have been driven far away beyond the light of consciousness—begin to stir within us.

It is said that the obvious contrast between sleep and waking is the absence from the former of consciously selective attention guiding trains of ideas in the service of purposive thought or purposive action. This is true, but it is not the essential difference. We are on the track of the essential difference when we think of sleep as before all else a loss of contact with the outer world. Only in this sense is sleep "the

resting-time of *consciousness*." All the complicated conditions of social existence, which during waking life we must either conform to, or consciously resist, are eliminated during sleep, and the mental life of dreams unrolls freely without the impeding fetters of social laws. This is more important, and more fundamental, than the obvious fact that dream-imagery is not bound by our experience of the rational order and connection of events in the outer world.

In like manner we may say that in sleep each one's nervous system as it were withdraws into a world of its own.

In deep sleep, especially during the first two hours, the various senses can be aroused only by stimuli much stronger than in the waking state; the muscles become less tense; the upper eye-lid falls, and many reflexes (*e.g.*, the knee-jerk) are in abeyance; the respiratory rhythm is less frequent, the breathing less deep (though it may be more noisy), the heart-beat less frequent, the secretions less copious. In the brain there is arterial anæmia with venous congestion, so that the *blood-flow* there is less than in the waking state. What alterations in the condition of the nervous system are implied in all this?

Sir C. S. Sherrington points out that there is no evidence to show that the cumulative result of the action of the nerve-cells during the waking day is to load the brain-tissue with "fatigue-substances" which clog the action of the cells and periodically produce unconsciousness. In the case of *muscular* fatigue, this "drugging of the tissue by its own excreta" takes place in the muscles; but we cannot simply assimilate nervous fatigue to this form. Nor is sleep a complete *exhaustion* of any part of the nervous system in the sense that prolonged activity has destroyed its "excitability." Even just before sleep, the nerve-cells are capable of a moderate amount of response.

There is in the nature of living matter a self-regulating process of action and reaction, or rather a self-regulating rhythm. The breaking-down or disintegrative process is

followed by one of reconstruction or redintegration. All through the waking period the activity of the nerve-centres is the object of a continuous stream of stimuli from within and without the body. The process of breaking down ("catabolism") is more rapid than that of building up; and at length it reaches a stage where the self-regulating process of living matter demands a reversal. A process of redintegration ("anabolism") sets in during which external manifestations of nervous energy diminish or cease.

This change is aided by the withdrawal of the nervous system from sensory stimulation. "The eyes are closed, the maintenance of posture by active muscular contraction is replaced by the recumbent pose which can be maintained by static action and the mere mechanical consistence of the body, the ears are screened from noise in the quiet chamber, the skin from localised pressure by a soft yielding couch. The effect of thus reducing the stimulating action of the environment is to give consciousness over to mere revivals by memory, and gradually consciousness lapses."[1]

Sleep differs in depth at different times: its depth being measured by the magnitude of the stimulus required to cause awakening.[2] But sleep is not at any time a simple or uniform state. "The mother who is asleep to every sound but the stirrings of her babe, evidently has the babe-portion of her auditory sensibility systematically awake. . . . That department, cut off and disconnected from the sleeping part, can none the less wake the latter up in case of need. So that on the whole the quarrel between Descartes and Locke as to whether the mind [*i.e.*, the whole mind] ever sleeps is less near to solution than ever. On theoretical grounds Locke's view that thought and feeling may at times wholly disappear seems the more

[1] Sherrington, art. "Muscle and Nerve," *Encyclopedia Britannica*, vol. xix. p. 49 (eleventh ed.).

[2] For example: sounds made by the fall of a small metal ball, from various distances, on to a metal plate.

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plausible. As glands cease to secrete and muscles to contract, so the brain should sometimes cease to carry currents, and with this minimum of its activity might well co-exist a minimum of consciousness. On the other hand, we see how deceptive are appearances, and are forced to admit that a part of consciousness may sever its connections with other parts and yet continue to be. On the whole it is best to abstain from a conclusion. The science of the future will doubtless answer this question more wisely than we can now."[1]

On these subjects, see M. W. Calkins, *Am. J. Psych.*, 1893, pp. 311-343, "Statistics of Dreaming"; Sir J. Crichton Browne, *The Lancet*, No. 3749, 1895, "Dreamy Mental States"; S. de Sanctis, "Experimental Investigations concerning Depth of Sleep," *Psych. Rev.*, vol. ix., 1902, p. 254; B. M. Hinkle, "Spiritual Significance of Psycho-Analysis," *Brit. J. Psych. (Med. Section)*, 1922, pt. ii., p. 209; Fischer, *Schlafen und Traümen*, Stuttgart, 1923; and (most important) Patrick and Gilbert, "Effects of Loss of Sleep," *Psych. Rev.*, vol. iii., 1896, p. 819.

§ 6. *Hunger, thirst, nausea.*—Organic sensations connected with the *alimentary canal* are capable of several different forms: hunger and its satisfaction, thirst and its satisfaction, nausea, and the pains of deranged digestion, are the most prominent. Hunger is really the expression of a general want of the bodily system; but the special feeling is localised in the stomach. In its earlier stages it involves no acute pain, but appears as an active impulse to seek food. In the absence of satisfaction, it is followed by severe suffering in the region of the stomach, and a general feeling of weakness or faintness, due to the diffused effects of the

[1] William James, *Principles of Psychology*, vol. i. p. 213.

organic need. The characteristic sensation of hunger is only a localised expression of this general need; and the sensation ceases when food is introduced either in the usual way or by other means. Similarly thirst, which begins as a feeling of dryness in the tongue and throat, is the expression of the deficiency of water in the system, and may be satisfied by the injection of water into the blood, the stomach, or the large intestine. Derangements of the digestive organs have diffused effects which are only too familiar. One of the most distressing of these, nausea, is sometimes of purely nervous origin; in the extreme case of sea-sickness it is always so; the beginning of this affection is a nervous malady produced by the unusual motion. This is an impressive example of *the direct effect of a state of the central nervous system on a group of vital functions*, with massive feelings corresponding. Even the *thought* of the possibility of sickness is often an important factor in the situation.

The fact that such organic sensations can be aroused by *ideas* is of far-reaching significance (see our discussion of "conditioned reflexes," ch. vii., § 2). For example: a person has repeatedly to take a short sea voyage, on which he is always ill; among his other experiences on these voyages is the playing of a violin by an itinerant musician who accompanies the steamer. This association is enough to make the notes of any violin which he hears, for a long time afterwards, partially reinstate the bodily condition and characteristic feelings of nausea. Or, again, tickling produces an effect on the central nervous system which has diffused reflex effects through the body, and arouses various organic sensations; but these can sometimes be aroused by the mere anticipation of the external stimulus. In the same way

the sight of nauseous food, or even just the thought of it, may be enough to arouse internal changes attended by sensations of nausea. The mere sight of a sword is said to have aroused very unpleasant internal sensations in King James I.

§ 7. *Organic Impulses.*—In speaking above of hunger, we have said that it appears as an active impulse to seek food. Babies actively, though blindly, *seek* the breast. An examination of the organic sensations we have distinguished will show that they all, with perhaps the exception of the coenæsthesis and internal temperature sensations, are associated with some impulse corresponding to the felt need, which forms a characteristic part of the experience.

According to their condition the muscles have need of exercise or have need of rest, and appropriate impulses subserve the satisfaction of those needs. The need of exercise is shown in the incontrollable restlessness of children who have been kept too long sitting still; the need of rest in their behaviour after a long walk or hard game. "There is, in rest after exercise," says Bain, "a close kinship to sleep, as if part of the fact were already realised." In the life of civilised man the products of fatigue seem sometimes to act as a stimulus to the central nervous system; they may render him "too tired to sleep." Such a man may become the prey of worrying thoughts owing, one must suppose, to diminished control. Normally, however, the need of sleep takes the form of an impulse, which, like other impulses dependent on organic needs, may become so strong as to be irresistible.

Air is essential to life. The need of air accounts for the birth cry of the infant. The associated impulse brings about the rhythmic contraction of the intercostal

and diaphragmatic muscles. This process draws air into the lungs. Here the oxygen contained in the air is absorbed by the blood, which in exchange gives out carbon dioxide. Nausea and sickness may be produced by air hunger just as by hunger for food.

The internal sensations of temperature can scarcely be said to have any characteristic impulses. They attract little notice unless they become intense, indicating a pathological bodily state. As a rule they merge in the coenæsthesis in which possibly they play a part of some importance.

It is claimed by many that the mating or sexual impulse corresponds to an organic need, and may fairly be compared to the food-seeking or hunger impulse. At certain seasons of the year mate hunger appears in all the higher forms of animal life, and is associated with heightened sensitivity to various external stimuli. There is a sex cycle or rhythm just as there is a food cycle or rhythm, or a breathing cycle or rhythm. It is thought by many that the sexual urge develops only at puberty with the maturation of the genital organs. Freud and his school maintain that this maturation is the culmination of a long developmental process, and that childhood and even infancy have their own sexual manifestations. The theory of "infantile sexuality" has awakened controversy in which the emotions of those taking part have been rather too much in evidence for us to feel satisfied that fair and full rational consideration has yet been given to the facts. Moreover, in this region, owing to the social embargo on all revelations of the activities in question, it is by no means easy to gather together a sufficient number of relevant facts.[1]

[1] See *Childhood's Fears*, by G. F. Morton (London, 1925): an interesting exposition of evidence without dogma.

The region which we have been looking at is the darkest in the whole range of psychological inquiry. Introspection is almost useless; and the more sound and healthy the physical organism is, the less possibility is there of any psychological evidence to be obtained therefrom. We have to rely on fragments of evidence from pathological cases in which the organic feelings are not in the normal condition. Their psychological importance lies first in the deep influence which they have on the movements of feeling aroused by distinct sensations and ideas. We are not yet able to give an exact account of the nature and limits of this influence. They are also a factor in the formation of the *feeling of familiarity* growing round objects which have previously or repeatedly entered into our conscious experience.

On organic sensation in general, the student should consult some of the following authorities: Bain, *Senses and Intellect*, ch. ii.; Ribot, *Psychology of the Emotions* (Eng. tr.) and *Diseases of Personality* (Eng. tr.); Mach, *Bewegungsempfindungen;* Richet, *Recherches expérimentales et cliniques sur la sensibilité;* Bertrand, *L'apperception du corps humain;* Kröner, *Das Körperliche Gefühl;* Beaunis, *Les sensations internes.* These books represent older work, but they are by no means obsolete. The outstanding facts are summarised by Myers, *Text-Book of Experimental Psychology*, vol. i., ch. ii., and by Titchener, same title, vol. i., pt. ii., ch. vi.

A few words may be added on a matter of terminology. We have used the term "need" more than once in the foregoing chapter. It may be defined as follows: a *need* is a tendency, more or less deep-seated, requiring satisfaction, and painful or depressing if unsatisfied. Needs are often subconscious motives, influencing action but not rising to the level of conscious ends. Needs may be constitutional, natural, or "innate"; or they may be acquired by the individual. They are either mental or bodily. (*a*) Many natural or acquired *mental needs* are of the type of what we shall call sentiments or emotional dispositions when these become active tendencies. (*b*) *Bodily needs* are also called *appetites.* The craving for alcoholic

stimulants is a case of an *acquired* appetite. Professor Stout describes "appetite" as follows: "It is distinguished from instinct, in that it . . . does not wait for an external stimulus, but appears [of itself in the life of the organism] and craves satisfaction. The *movements*, however, by which an appetite is gratified are mostly reflex and instinctive. For example, the child has the imperfect instinct of sucking to satisfy the appetite for food. Appetite is an impulse in which the organic process is well defined and deep-seated, and is only to a very limited degree subject to voluntary control or modification. The appetites generally recognised are those of hunger, thirst, and sex; yet the need of air, the need of exercise, and the need of sleep come under the definition."

CHAPTER VII.

THE DEVELOPMENT OF MENTAL ACTIVITY.

§ 1. *Reflex movements.*—When a child is born, its heart beats and its blood courses through its veins, its lungs move regularly, and many reflexes—such as the contraction of the pupil of the eye to light, swallowing, hiccoughing, &c.—are already established. Its limbs move, its head rolls about, its eyes open and shut. But the child cannot make a single movement voluntarily. An examination of an infant's brain, in which the higher brain cells—those which function in voluntary action—are undeveloped, would itself prove this. *A priori* considerations also convince us of the fact, for will—as we have seen—involves knowledge of an end: and how can the infant, new to earth and sky, have any idea of an end? Still, random movements—*i.e.*, movements initiated by an automatic action of the centres not involving consciousness—do occur, and the child grows: grows physically by means of the food supplied to it, grows mentally by aid of the host of stimuli which are ceaselessly beating on its sensitive nerve-endings, and seeking an entrance into consciousness. As there is a craving for food, so there seems to be a craving for sense stimulation, and for muscular movement. An

infant has been observed to follow a light with its eyes as early as the second day.[1] Discrimination gradually arises, pleasure in colours and in musical sounds is shown. Actions appear which seem to be instinctive in origin—*i.e.*, they have a purpose, but their purpose is not foreseen by the child. Such are seizing, sitting up, standing, walking. In such movements the characteristic habits of the race assert themselves.

Many writers regard reflexes as the primitive type of all action—as that from which all movement is developed. With a view to understanding more clearly the genesis of voluntary action, let us then examine this more closely. A reflex act may be defined as a specific response which invariably follows a specific stimulus: thus when a frog's foot is touched with acid, the muscles of the leg contract; when food is placed in a dog's mouth, saliva is excreted. A nerve impulse initiated by the stimulus traverses an arc of the first level. Such an arc is made up of at least three units of nervous structure or neurones — (*a*) a sensory or receiving neurone, a fibril of which ends in the organ stimulated; (*b*) a connecting neurone, located in the case of bodily reflexes in the spinal cord; (*c*) a motor or effluent neurone of which the cell body is in the cord, while a long fibril passes to the gland or muscle concerned. Consciousness is not involved: though very often, owing to the stimulation of sensory nerve elements by the movement, there is awareness of the movement after it has taken place. Reflex responses are not *learned*; they are dependent on the structure of the nervous

[1] Peterson and Rainey, *The Beginnings of Mind in the New Born*, Bulletin of the Lying-in Hospital of the City of New York, December 1910.

system. They vary with the strength of the stimulus, a weak stimulus giving a small response, a strong stimulus obtaining a stronger and more complex response owing to the nervous impulse at the centre spreading along other allied motor channels.

§ 2. *Conditioned Reflexes.*—By his experimental investigation of the salivary reflex the Russian physiologist, Professor Pawlow, has succeeded in showing that a reflex can be aroused by stimuli arbitrarily selected. Such manufactured reflexes he calls "conditioned." The experiments were performed on dogs. The unconditioned stimulus—*i.e.*, the stimulus which invariably brings about the excretion of the saliva—is the placing of food in the animal's mouth. It was, however, known that other stimuli, such as the sight or the smell of food, sometimes brought about the same reaction. Such a stimulus Professor Pawlow called a conditioned stimulus, and he set out to determine its laws.

He found that a conditioned stimulus ceases to bring about the reflex when it has been made to act a number of times without being accompanied by the unconditioned stimulus. Moreover, the shorter the interval between such repetitions, the more quickly is the reflex obliterated. It usually recovers spontaneously after one, two, or more hours, but it may be completely destroyed by a sufficiently prolonged series of repetitions; thus, if a certain kind of food is shown to a dog, without being given to him to eat, for some days or weeks continuously, then it loses its power of acting on the salivary glands through the medium of the eye or nose. But we can restore any conditioned reflex which has been obliterated, simply by allowing it to act once more in conjunction with the unconditioned reflex.

When these facts had been ascertained, obviously the next step was to try whether it was possible to manufacture conditioned reflexes. Here the most striking success crowned the efforts of the experimenters. The method pursued was simply to let any sensory stimulus whatever, such as the ringing of a bell, the application of heat or cold to the skin, the shining of an electric light, act for a number of times invariably along with the unconditioned reflex: for example, whenever food was placed in the dog's mouth (unconditioned stimulus), a certain note on the piano was struck (stimulus selected to be converted into a conditioned stimulus); it was found that after thirty, forty, or more repetitions, the conditioned stimulus (the striking of the note) would of itself bring about the flow of saliva.

In the course of this investigation Professor Pawlow has furnished us with a proof of the extreme fineness of discrimination belonging to the nervous system, which is of sufficient interest and importance to be recorded here. He tells us that when the sound of a certain note has been established as a conditioned stimulus, notes which differ from it by so little as a quarter of a tone will often fail to give the response.

Conditioned reflexes can be formed in human adults by exactly the same method: see Watson, *Psychology from the Standpoint of a Behaviourist*, pp. 32-35. The establishment of the conditioned reflex has been regarded, especially by the "Behaviourist" school, as evidence in favour of a mechanical interpretation of human life. It is, however, impossible to be certain that the process is purely mechanical. "If it could be shown that a conditioned reflex of this sort can be established in a brainless dog, or in a dog or other animal deeply anæsthetized with chloroform or ether, the Mechanist's interpretation of the

particular facts would be strongly supported and his general position greatly strengthened. But this has not been shown to be possible. The attempt to demonstrate this possibility should be the all-absorbing task of the Behaviourist. But I do not know of any attempt at such demonstration, and all we know of the functions of the nervous system tends to make it appear very improbable that any such attempt can succeed. For we know that dogs (and other animals) deprived, not of the whole brain, but of the cerebral cortex only, seem incapable of learning, of profiting by experience, or of acquiring 'conditioned reflexes.' Yet an animal in this condition, retaining intact the cerebellum and basal ganglia of the great brain, is very much more like a normal animal than is one in which the whole brain is out of action. An animal in the former condition will wander about restlessly, will eat and perform all the bodily movements essential to continued living, and he may be provoked to what seem to be emotional expressions (especially anger). Yet, in spite of the fact that his movements show some of the marks of behaviour, he never seems to learn or to profit by experience. Though he may be fed by the same man for months, he seems to show no recognition of the man or of the approach of food by anticipatory actions such as the Mechanist would call 'conditioned reflexes'" (McDougall, *Outline of Psychology*, ch. ii., p. 55).

We may safely regard the nervous system of the human infant as no less sensitive and no less liable to form conditioned reflexes than that of the dog. Movements are multiplied; adjustments which seem to denote expectation take place; by imperceptible gradations intelligent purpose mingles with the life of the organism.

The cortical areas which subserve sense experience develop after birth under the influence of stimuli pressing in along the afferent nerves from the organs

of sense. Among these organs of sense are the skin and the muscles.[1] Very few movements fail to send sensory stimuli towards the centre, which stimuli probably play a very important part in mental development.

In a later series of experiments Professor Pawlow succeeded in producing conditioned reflexes in response to stimuli which were brought into action only after the unconditioned reflex had ceased. This result seems to us to have an important bearing on a very characteristic feature of infantile behaviour. I mean the tendency to repetition. The movement sensations invariably following upon the movement must act as a conditioned stimulus bringing about a reproduction of the movement. To the establishment of such a reflex are perhaps due the amazing repetitions of the first few years of life before control has been established.[2]

§ 3. *Instinctive tendencies.*—It is, we suppose, generally agreed that if an infant were kept from birth in the dark, the power to see would not develop. When a child is blind from birth the sight centres of the brain do not follow the normal course of development. It must not be thought that a child is born into a world of colour, space, sound, and movement such as forms our environment. Although at birth his eyes are open, he sees little if any more than a newly-born kitten, and for some hours or even days he is deaf.[3] The development of any of our senses follows only upon the continuous beating on its end organ of sense stimuli—*e.g.*,

[1] For a fuller account, see ch. ix., §§ 5, 6.

[2] For illustrations, see Drummond, *Dawn of Mind*, pp. 122-124, and *Some Contributions to Child Psychology*, pp. 140-146.

[3] There are considerable individual differences. See Peterson, *op. cit.*

rays of light in the case of the eye. In precisely the same way the higher centres of the brain are roused to action by the pouring in of stimuli propagated from the lower centres, whence they may possibly already have produced one outward effect in the shape of reflex action. Innumerable sensori-motor arcs or sensation reflexes are thus formed as the power of discrimination grows. This development of sensibility is the fundamental psychological mystery; the fact that as time passes the child comes to respond to rays of light of different wave-lengths by definite sensations of colour is for psychology a basal fact beyond which it does not pretend to go. The sensations which thus gradually appear as typical reactions of the mind in response to physical stimuli are, so far as we can judge, approximately the same for all mankind. Movements may be viewed in the same way as simply reactions on the environment, and some of them (reflexes) are, as we have seen, as inevitable as sensations. And even this is not all; modes of thought are also inevitable reactions—*i.e.*, no human being is accounted normal who does not come to have certain ways of thinking in which he resembles other normal human beings. Thus a proposition of Euclid is as convincing to a child when he is old enough to understand it as it is to you and me. That is to say, in the space world which he has gradually come to recognise as existing around him all Euclid's theorems are implicit; just as the brilliancy and variety of all the colours of the spectrum were implicit in the first vague mental stir which arose when rays of light first fell upon his new-born eyes. And as modes of thinking are thus implicit in the child's mind, so are modes of action, or perhaps better,

modes of feeling which prompt to action. To such modes of feeling Professor James extends the term Instinct, and in his wonderfully suggestive chapter under this heading he gives a long list of human instincts.

Instinctive acts are distinguished from reflexes by their greater complexity and by the fact that they are responses to a total situation on the part of the organism as a whole. They are effective on their first appearance; they are not learned, though they are more modified by experience than was once thought to be the case. They resemble many of those automatic trains of action in man which have become stereotyped by habit, and which seem to be guided throughout their course by successive sense stimuli. The following passage, quoted by Professor James from *Der Thierische Wille*, by G. H. Schneider, will elucidate this point: "When the burying beetle perceives a carrion, she is not only impelled to approach it and lodge her eggs in it, but also to go through the movements requisite for burying it; just as a bird who sees his hen-bird is impelled to caress her, to strut around her, dance before her, or in some other way to woo her; just as a tiger when he sees an antelope is impelled to stalk it, to pounce upon it, and to strangle it. When the tailor-bee cuts out pieces of rose-leaf, bends them, carries them into a caterpillar- or mouse-hole in trees or in the earth, covers their seams again with other pieces, and so makes a thimble-shaped case, when she fills this with honey and lays an egg in it, all these various appropriate expressions of her will are to be explained by supposing that at the time when the eggs are ripe within her the appearance of a suitable cater-

pillar- or mouse-hole and the perception of rose-leaves are so correlated in the insect with the several impulses in question, that the performance follows as a matter of course when the perceptions take place." Such series of activities all directed towards one end are often called chain instincts.

In the case of the higher animals we may suppose that few habits instinctive in origin fail to be much modified by memory and intelligence. In man these all-important factors come into play so soon that acts instinctive in origin have no chance of becoming stereotyped unless they are very simple and necessary. The following are examples of such simple instinctive acts; they differ from the pure reflexes in this, that they all become subject to the command of the will.[1]

Act.	Stimulus.
Biting.	Object placed in mouth.
Licking.	Sugar held to tongue.
Clasping and carrying to mouth.	Object touching hand (or foot).
Smiling.	Various gentle stimuli, such as fondling.
Crying.	Over-violent stimuli, solitude, hunger, &c.
Holding head erect.	Seems to occur spontaneously with the maturing of the nerve-centres concerned.
Vocalisation.	Ditto.

[1] This statement is not meant to imply that the will has no influence on the reflexes; it may both further and hinder them to some extent, but very few if any of them can it entirely control.

Act.	Stimulus.
Sitting up.	Seems to occur spontaneously with the maturing of the nerve-centres concerned.
Standing.	Ditto.
Locomotion.	Ditto. The feet being placed on the ground will often act as a stimulus, bringing about the movements required for locomotion before the legs are strong enough to support the weight of the body.

A glance over this list will convince the reader of two things: 1. Even allowing that we cannot call these acts purposeful on the part of the child, yet each of them leads to a great deal. 2. They appear at different times: for instance, the impulse to creep or walk is dormant during the first few months, and may arise quite suddenly without there being any change in the environment to account for it. That a pure instinct may be dormant at birth, and yet when the time is ripe may show itself in perfected action, is shown by the fact that birds kept in confinement for a few weeks after birth fly with a precision in no way different from their elders. It would seem, then, that an instinct may arise at any time during the period of growth. But if it arises late it stands little chance of ever attaining to its full development, because it will so quickly be modified by intelligence—which may, indeed, even inhibit its inception altogether.

The other modes of reaction classed by James as instincts are not, like those given above, definite responses to more or less definite stimuli. They embrace practically all the infinite variety of complex activity of

which man is capable. Their claim to rank as instincts is that they are modes of action prompted by definite modes of feeling which arise spontaneously in every human being. Such a classification can be made by a man only because he *is* a man, and himself knows the inner experience which starts the act. The classification given above might have been made by an outside spectator possessing none of the feelings of a man; but no such outside spectator could hope to reduce the apparently chaotic and infinitely varied combinations of movements included below to even the semblance of order afforded us by this classification.

We arrange them according as the Intellectual, the Active, or the Emotional aspect of our nature appears most prominent; but it is needless to remind the reader that all three aspects can be distinguished in them all.[1]

INTELLECTUAL.	ACTIVE.	EMOTIONAL.
Curiosity.	Imitation.	Anger.
	Hunting.	Fear.
	Acquisitiveness.	Love.
	Constructiveness.	Hate.
	Play.	Joy.
	Cleanliness.	Grief.
	Secretiveness.	Shame.
	Emulation.	Pride.
		Modesty.
		Sociability.
		Shyness.
		Sympathy.
		Jealousy.

[1] The fundamental human tendencies to find satisfaction in Truth, Beauty, and Goodness are also *instinctive* in the same sense; cf. ch. viii., §§ 11, 12.

In a large proportion of these instincts it will be seen the conative aspect is dominant; in all of them it is evident, since all of them clearly prompt to action of some sort. Those which have been selected as in a special degree active or conative have been so selected as indicating love of power, of self-expression. It is clear also that though only one instinct appears in which the cognitive aspect can conceivably be regarded as dominant, yet Fear, Love, Acquisitiveness, and all the rest imply an object—something we fear, something we love or desire, something we hunt or acquire,—that is, the cognitive aspect is an integral part of the instinct itself. In a normal child whose environment is as it should be, all these instincts will spring up during the first few years of life, some being more prominent at one period, some at another.

Professor McDougall follows James in assigning to instinct a leading part in the determination of human behaviour. He also stresses the essentially psychic character of instinct, maintaining that it is not simply an inherited arrangement of nervous arcs, but is a mental process having as such the threefold aspect common to all such processes. He defines it as "an inherited or innate psycho-physical disposition which determines its possessor to perceive, and to pay attention to, objects of a certain class, to experience an emotional excitement of a particular quality upon perceiving such an object, and to act in regard to it in a particular manner, or, at least, to experience an impulse to such action."[1]

[1] *Introduction to Social Psychology*, p. 29. See also the same author's *Outline of Psychology*, p. 110, where the definition appears in almost the same words.

§ 4. *Emotion and Instinct.*—James considers that any object that excites an instinct excites an emotion as well. Nevertheless, in spite of the fact that he uses such words as Fear and Anger to denote instincts, he does not identify emotion and instinct. To him instinct is the bodily activity which enters into relation with the object that excites the reaction—the taking hold or running away: striking an emotional reaction is more delicate and is limited to the body itself—*e.g.*, smiling, blushing, &c. Nevertheless "the physiological plan and essence of the two classes of impulse is the same." This position seems on the whole clearer than that of McDougall, who defines a primary or simple emotion (incapable of introspective analysis) as "the affective aspect of the operation of any one of the principal instincts." An emotion such as Fear is surely not a mere aspect of a mental process; it is a complete mental process at once cognitive, conative, and affective. It shows all three aspects even when it is not attended by the muscular activity denoted by the term Flight.

McDougall's use of the word "aspect" is not at all clear. The doctrine of the threefold nature of mental process does not mean that every unitary mental process is made up of (1) a cognitive part, (2) an affective part, (3) a conative part, following one another in time. It means that we can distinguish by an act of abstraction any one of the three aspects at any moment in any mental process. They are synchronous, not successive. Here McDougall seems to have been led astray by his clear concept of the physiological basis of instinct. "Every instinctive process has the three aspects of all mental process, the cognitive,

the affective, and the conative. Now, the innate psycho-physical disposition, which is an instinct, may be regarded as consisting of three corresponding parts, an afferent, a central, and a motor or efferent part, whose activities are the cognitive, the affective, and the conative features respectively of the total instinctive process. The afferent or receptive part of the total disposition is some organised group of nervous elements or neurones that is specially adapted to receive and to elaborate the impulses initiated in the sense-organ by the native object of the instinct; its constitution and activities determine the sensory content of the psycho-physical process. From the afferent part the excitement spreads over to the central part of the disposition; the constitution of this part determines in the main the distribution of the nervous impulses, especially of the impulses that descend to modify the working of the visceral organs, the heart, lungs, blood-vessels, glands, and so forth, in the manner required for the most effective execution of the instinctive action; the nervous activities of this central part are the correlates of the affective or emotional aspect of the total psychical process. The excitement of the efferent or motor part reaches it by way of the central part; its constitution determines the distribution of impulses to the muscles of the skeletal system by which the instinctive action is effected, and its nervous activities are the correlates of the conative element of the psychical process, of the felt impulse to action."

Obviously in this passage McDougall is thinking of the succession of physiological events; nothing is gained by attempting to equate these successive phases of the physiological activity with the three aspects of mental process. It is a mistake to suggest, as is done in the last sentence, that the conative element of the psychical process is the *felt impulse to action:* there are many mental processes in which the conative element is well marked in which there is no felt impulse to action at all. Similarly the nervous activities of the central part of the disposition may be

the correlate of the emotion, if we use that word, as is usually done, to denote the total mental experience of the moment, but we cannot think of it as the correlate of the affective *aspect* of the psychical process. To attempt this would lead only to confusion of thought.

One difficulty in the way of regarding emotion as an integral part of instinct is that many instinctive processes are unaccompanied by any specific emotion. Drever maintains that the affective aspect of instinct is better denoted by the term *interest*. According to his view emotion proper develops only when there fails to be immediate satisfaction of the instinct: such arrest or "tension" produces emotion. Biologically the function of emotion is to reinforce impulse and interest. The modification of bodily activity, the change in functioning of heart, lungs, glands, &c., has the effect of rendering more likely the attainment of satisfaction. How far the conscious perturbation—*e.g.*, the fear experience—is a necessary accompaniment of this organic activity it is hard to say. Emotion as a conscious process may arise through the inability of the nervous impulses to drain off into the muscles and other organs; the hunted fox may have no fear experience until his flight is hindered; one would be glad to think so. Drever would not apparently go so far as this; he agrees with McDougall in his view that "the great instincts of human nature have all their accompanying and typical emotion."

A useful table of innate tendencies, founded partly on McDougall's analysis, is given by Drever as follows:—

INNATE TENDENCIES.

Appetite Tendencies.		Instinct Tendencies.		
General.	*Specific.*	*Specific.*		*General.*
		Pure.	*Emotional.*	
1. Seeking of Pleasure.	1. Hunger.	Probably numerous; difficult to distinguish from reflexes; may perhaps be classified as:—	1. Fear.	1. Play.
2. Avoidance of Pain.	2. Thirst.	1. Reactions of Adjustment and Attention.	2. Anger.	2. Experimentation.
	3. Sleep.	2. Reactions of Prehension.	3. Hunting.	3. Imitation.
	4. Need of Air.	3. Reactions of Locomotion.	4. Acquisitive.	4. Sympathy.
	5. Need of Exercise.	4 Reactions of Vocalisation.	5. Curiosity.	5. Suggestibility.
	6. Sex.		6. Gregarious.	
	7. Nausea.		7. Courtship.	
			8. Self-display.	
			9. Self-abasement.	
			10. Parental.	

The student should compare this list with that given on p. 178. The "need of air" and the "need of exercise" are added to Drever's list. It will be noticed that the first six specific appetite tendencies are "needs" (need of food, drink, &c.), and may be correlated with the first general appetite tendency (a seeking tendency); whereas the seventh is an aversion and may therefore be correlated with the second general appetite tendency. Possibly all the senses have their "needs," as is suggested on p. 164—*e.g.*, there may be innate hunger for light as well as for food.

§ 5. *The criteria determining Instinct.*—In determining whether an emotion is primary, or an impulse instinctive, McDougall relies mainly on two principles. First, the occurrence of the emotion and impulse among the higher animals is *prima facie* evidence in favour of their primary character, just as their non-occurrence is *prima facie* evidence against it. Secondly, owing to the relative functional independence of the instincts, one would expect to find them sometimes occurring in an exaggerated form—the balance of character being thus upset. As a matter of fact we do find such hypertrophy in the case of fear, anger, acquisitiveness, &c. Drever admits the usefulness of these tests, but considers that from the psychological point of view there are three others which are more important.

1. Irreducibility by introspective analysis to simpler components.

2. Arousal of impulse and emotion, with its specific and unmistakable expressive signs, by specific objects or specific kinds of objects, prior to individual experience of these objects.

3. Manifestation in the early months of child life.

All of these tests, he admits, are passed by six of the listed tendencies—namely, anger, fear, the two self-

tendencies, the gregarious instinct, and the acquisitive tendency.

From the biological point of view the second of those criteria would be the most satisfactory: but the life of civilised man is such that it is extremely difficult to be sure that even the fear-flight tendency, which is so universally accepted as an instinct, is aroused by specific objects or specific kinds of objects, prior to individual experience. There can be no doubt that instinctive reactions to objects which are not original stimuli, but have been associated with the original stimuli, will take place; we have "conditioned" instincts just as we have conditioned reflexes. Fear of darkness for example is probably not a true instinct; the darkness stimulus has become associated with the unconditioned stimulus. Such associations certainly take place very readily in human infants, and rapidly disguise the inborn constitution. It is possible that the scientific study of young children, which is at present just beginning to win recognition as a worth-while pursuit, will very much cut down the number of recognised native tendencies. Watson, as the result of his studies of infants in maternity wards, has suggested that to the original nature of man belong the following group of emotional reactions: fear, anger, love—the word love being used in approximately the same sense as Freud uses the word sex.[1] He adopts the view that man has few instincts, the supply of instincts being always in inverse ratio to the power to form habits: man is the supreme habit-forming animal: he starts with few pattern reactions, he makes his own patterns. Apart from instincts bearing upon the bodily functions, man's chief instincts are reactions of attack and defence and manipulation. Gregariousness Watson

[1] *Psychology from the Standpoint of a Behaviourist*, p. 199.

accepts, though he maintains it can be analysed into simpler factors: almost all the others that have been suggested, including the maternal or parental instinct, he denies. His views are of course affected by his endeavour to reduce psychology to a science of "behaviour" in which no account is taken of the data obtainable by introspection.

Summarising our own views, we agree with McDougall in stressing the conscious experience involved in instinctive activity. We admit that instinct and emotion occur in close association, especially in fear-flight and anger-fighting; we think, however, that they are to some extent independent, and that the better name for the affective aspect of instinct is that suggested by Drever—viz., interest. We think that the principles revealed by the study of conditioned reflexes hold also in the case of instincts, and determine the behaviour of the infant to a greater extent than has yet been realised. The impulsive "interest" in each successive phase sustains the marvellous chain instincts of the animals where there is and can be no foresight of the end of the activity as a whole. Such chain instincts occur in man scarcely if at all; his intelligent realisation of ends and of his own activities as means towards ends, give the more highly developed of the human species a power of shaping their own lives—a power of conscious creation which is very little evidenced in animal life.

§ 6. *Instincts as transitory and as indeterminate.*—A study of Instinct in the animal world makes plain two points which are of great importance to the educator. The first of these is that *instincts are transitory*. In illustration of this we quote the following observation of Mr Spaulding's. When chicks first emerge from the egg they "will follow any moving object. And when guided by sight alone, they seem to have no more dis-

position to follow a hen than to follow a duck or a human being. Unreflecting lookers-on, when they saw chickens a day old running after me and older ones following me for miles and answering to my whistle, imagined that I must have some occult power over the creatures; whereas I had simply allowed them to follow me from the first. There is the instinct to follow, and the ear, prior to experience, attaches them to the right object." But of three chickens which were kept hooded until nearly four days old, each, when unhooded, "evinced the greatest terror to me—dashing off in the opposite direction whenever I sought to approach it. The table on which they were unhooded stood before a window, and each in its turn beat against the window like a wild bird. One of them darted behind some books and, squeezing itself into a corner, remained cowering for a length of time. . . . Whatever might have been the meaning of this marked change in their mental constitution—had they been unhooded on the previous day they would have run to me instead of from me—it could not have been the effect of experience; it must have resulted wholly from changes in their own organisations."[1]

The chicks' early instinct of running towards a moving object has engendered a habit of seeking their mother, and this habit, be it observed, is not endangered when the contrary instinct arises. Mr Spaulding's second set of chicks would be "misanthropes" all their days, because when their friendly instinct was active it was allowed no scope. In the same way it is possible permanently to impoverish a child's nature by not giving him opportunities at the right time. The chick's first instinct has served its

[1] Quoted from James, *op. cit.*, vol. ii. p. 396.

purpose when it has created a habit of following the mother; similarly each of the child's instincts should be made to act as the foundation of a habit. Thus the instinct of curiosity may serve as base for the habit of desiring knowledge, that of constructiveness for a habit of clear thinking, that of secretiveness for a habit of seemly reserve, that of imitation for habits of good manners, correct modes of speech, and so on.

Secretiveness is dropped from the list of instincts by McDougall, and by Drever is regarded as the manifestation of several tendencies—*e.g.*, fear, acquisition, self-abasement. At an early age children experience elation when they have a secret; when they give it away, they feel themselves diminished. For full enjoyment others must know there is a secret but not what the secret is. Few little children seem to show a tendency to secretiveness for its own sake.

Another lesson which the story of the chicks teaches us is that *the object which satisfies the instinct is indeterminate:* its determination depends in some degree (how much we as yet know not) on the educator. The difference between an arrant gossip and a man of science is to some extent a difference in the directions of their flaming curiosity. Moreover, the pleasure associated with the gratification of the instinct is transferred, as the latter becomes transformed into a habit, to the object towards which the instinct was directed. To take one example: if a child's hunting instinct is allowed to find satisfaction only in the playground, the interest-complex founded upon it will be concerned only with sport, and the pleasure which the gratification of his instinct has given him will be transferred by him to the world of sport; but it is not difficult by the exercise of a little ingenuity to direct this instinct on objects intellectual, and so form interest-complexes

of such a nature that they will give scope to the highest powers that the mind can develop. The so-called "sublimation" of instinctive tendencies connected with the conservation of the race may be brought to mind in connection with this transference—*e.g.*, when the parental instinct finds scope in social work.

Drever in his *Instinct in Man* gives a valuable historical account of the way in which the word has been used in psychological thought. In the main his book is an acute criticism of current conceptions of instinct. He agrees most nearly with the views expressed by McDougall in his *Introduction to Social Psychology*. In 1910 a symposium on the subject was held in London, and the papers prepared for the occasion were published in the *Brit. J. of Psy.* for that year. Lloyd Morgan has expanded his views in a volume entitled *Instinct and Experience*. For papers on "Instinct and the Unconscious," by Rivers, Myers, Jung, Graham Wallas, Drever, and McDougall, see *Brit. J. of Psy.*, November 1919; for papers on "The Classification of the Instincts," by Drever and Ernest Jones, see *Brit. J. of Psy.*, January 1924. On the origin of instinct (a problem of psycho-physical evolution), see Baldwin, *Story of the Mind*, ch. iii.

Mr A. F. Shand's elaborate work, *The Foundations of Character*, 2nd ed., 1920, deals mainly with the analysis and classification of the emotions; but a very suggestive discussion of some aspects of instinctive activity will be found in bk. ii., ch. i. ("Instincts and Emotion") and Appendix i. ("Impulse, Emotion, and Instinct"). The relation between emotion and instinct is in his view more variable than Professor James, Dr McDougall, or Dr Drever appear to admit. He finds (i) "that an instinct may be excited, and even evoke the behaviour which is characteristic of it, without exciting an emotion"; (ii) "that in the system of an emotion there may be not only one but several instincts," as in the case of fear, involving in one case instinctive flight, in another, instinctive concealment, or first one and then the other, while the emotion remains the

same; and (iii) "that the same instinct may be connected with the systems of different emotions" (*op. cit.*, bk. ii., ch. i., § 2). An emotion involves a more or less organised group of conative and affective tendencies, and is usually a more comprehensive fact than an instinct with its impulse. Hence he proposes the following "tentative law" of the relation between instinct and emotion: "Every primary emotion tends to organise in its system all instincts that are serviceable to its innately determined end, and to acquire many serviceable tendencies which modify such instincts." Here Mr Shand seems to use the word "emotion" in the sense of "sentiment" or psychological disposition.

§ 7. *Process of Learning.*—The native reactions (reflex, instinctive, emotional) are not learned. They may, however, be modified, and this modification is the result of a process which we call the learning process. When fowls run to meet the girl who is wont to bring their food, we say they have learned that she is the food bringer. As a matter of fact she is a visual and perhaps an auditory stimulus which has become associated with the food-seeking activities. This *learning* to respond to a stimulus associated with the primary stimulus takes place, as we have seen, even on the reflex level. Much of the learning of the little child during infancy is of the conditioned reflex type, and the habit foundations thus laid have certainly a directive influence of the greatest importance on the developing personality. Such association of stimuli at present is left to chance, the significance of such association not being recognised by parents and nurses. It is the reason or at least part of the reason why we find such highly individualised reactions in babies. Very often no one can account in any way for their behaviour because the original associative process has passed unnoticed. Such associations, as we have seen

in Pawlow's experiments, are not permanently fixed; yet many of them may easily settle down into habits. Thus a little child might be terrified by the barking of a dog, sound being the natural stimulus to the fear instinct, and thereafter might show fear at the very sight of a dog—or other animal.

The word learning is not usually employed in quite such a wide sense as is here suggested. In its ordinary sense it implies some realisation of an end to be attained; we learn to swing a golf club so as to hit a ball in a particular way, or we learn to clothe our ideas in vocal forms which will be understood by other people. Much of our early learning, indeed much of our learning throughout life, consists in obtaining command over our physical organism. In the human body there are over four hundred muscles, so that the number of ways in which these may theoretically be combined reaches so high a figure that we may call it infinity. In the performance of any skilled movement it is not likely that the co-ordination of muscular movements required should result from chance. When we learn any new series of skilled movements, as when we begin golf or tennis or skating, our first attempts are apt to be very poor affairs. We give out far too much energy, we contract muscles which ought to be left slack, we let our muscles waste their power in opposing one another—as when the swing of our arms in using the golf-club tends to move us round, and our corporal muscles hold us rigid. A child learning to write grips his pen for dear life, stiffens his body, puts out his tongue, rolls his head from side to side. No wonder the writing lesson is an exhausting one! In early life the outpouring of energy seems to be almost miscellaneously directed, and the results are

often very funny and most unexpected to the little living wills which are seeking to rule their environment. Thus two well-known students of baby-life, Mrs Hall and Miss Shinn, have both noted that on several occasions the effort to creep towards something resulted in a backward movement, so that the desired object, as in the looking-glass world, only got farther and farther away.

How does precision of movement result from this miscellaneous outflow of energy?

The following experiment on cats, made by Thorndike, serves very well to illustrate the formation of a definite and purposive movement. He "confined hungry cats in cages closed by doors that would fall open when certain catches within the cages were pushed or pulled in certain directions, and food was put near by where it could be seen by the cats. The result commonly was that the cat persisted in clawing and scratching at the walls of the cage until it happened in course of its random movements to push the catch and so escape. On being put through the experiment time after time in the same cage, under similar conditions, a cat usually repeated the same kind of random clawings and scratchings, but on successive occasions the time elapsing before the successful movement was made became less and less, until after a number of repetitions, varying from a small to a large number, the cat would perform the necessary movement at once every time that it was put into the cage."[1]

In this case the right movement is not selected and fixed by intelligence as might happen in the case of a

[1] Quoted from McDougall's *Physiological Psychology*, "Temple Primers," p. 146.

child; but the fact that the time required by the cat to gain freedom grows progressively shorter, shows that some factor is at work which favours the right adaptation. Each movement of the animal may be regarded as resulting from the passage of the nervous energy along a sensori-motor arc; that is, the sight and touch stimuli aroused by the cage and by the food which is the incentive to the cat's efforts, travel along the sensory nerves to the central nervous system, and thence descend the motor nerves and rouse the muscles to action. We may to a certain extent explain the speeding up if we suppose that the formation of an unsuccessful sensori-motor arc tends to depress the amount of nervous energy available; whereas the formation of a successful one tends to increase it. This increase flows along the track which has just been formed, and by partially re-innervating it "deepens" it. Then when the cat is again put in the cage the successful movement is more closely associated with the part of the cage where the catch is than any other movement, and hence is likely to occur as soon as the cat turns its efforts in the right direction. In this way all successful lines of action are perpetuated, whereas unsuccessful ones are dropped.

In the case of a man in similar circumstances, definite experiment, founded on previous experience, would take the place of the cat's wildly directed struggles. Such a man would direct all his attention to the door, and probably to the catches, and his movements would be partially determined by his knowledge of the nature of such holdfasts; at times he might make no movements at all, unless perhaps of his eyes; he would be forming hypotheses regarding the nature of the fastening which he would proceed to test. After the

right solution has been obtained, the time required to secure release will sink to a minimum and remain constant.

The contrast between the cat's method of learning which is regarded as purely mechanical, and largely chance determined, and the man's method of learning regarded as due to insight into the nature of the situation, is very great. The cat's method, which shows wild striving, many failures and at last success, is called the *Trial and Error Method*; the man's method, which shows directed striving, definite rejection of movements seen to be useless, and success which does not show itself in the gradual decrease of time taken, but in the abrupt decrease of time taken, is called the *Rational or Intelligent Method.* As children grow we see them progressing from the Trial and Error Method to the Rational Method; at a very early age the second method mingles with the first, and to the end of life probably great difficulty and long frustration of effort are liable to cause the rational method to give place to pure trial and error.

As the Trial and Error method undoubtedly plays some part in human learning, so probably does the Rational Method play some part in animal learning. This has, we think, been convincingly demonstrated by Köhler in his remarkable experimental work on the solving of practical problems by chimpanzees.[1]

Learning how to solve a problem is just one form of learning, and perhaps not the most characteristic. Mr E. J. Swift[2] points out that learning may be roughly

[1] See above, ch. ii., § 5, pp. 28-9.
[2] *American Journal of Psychology*, vol. xix. p. 201.

classified under three types; the acquisition of skill or learning to do; the formation of associations or the acquisition of knowledge; the acquisition of control or the formation of inhibitions. In accordance with this classification three researches were undertaken: (1) on tossing and catching balls, (2) on learning shorthand, (3) on the acquisition and control of the reflex wink. Regular records of progress were kept, and the results plotted in the form of curves. A few of the results of these investigations may be set down here.

(*a*) Fatigue lowers the day's score, and practice in such circumstances probably hinders the whole process of learning.

(*b*) Effort is unfavourable to the score, and prevents the learner even doing himself justice. Effort in this sense means the intrusion of elements of self-consciousness which have the effect of positively distracting the attention from the matter in hand.

(*c*) Progress is not uniform, but by fits and starts. When a long pause took place it was sometimes found to be due to the fact that the physiological limit of the method used had been attained, and further progress was possible only when a new method was adopted. It is at such moments that the suggestions of the teacher have their greatest value.

(*d*) In the ball-throwing experiments the attempt was made to obtain a curve of forgetting. After practice entirely ceased, a trial was made every thirty days. The record obtained turned out to be a new record of learning: in two of the cases the gain in skill during the monthly tests was something remarkable. Bourdon, in a series of experiments on speed in associating French words with their English or German equivalents and *vice*

versa, found that after intervals of thirty days and more not only did the effects of practice persist, but a positive gain in speed was apparent.[1] That many teachers have a practical acquaintance with this fact is shown by their habit of introducing a new subject to their pupils shortly before the holidays.

(*e*) Varieties of method seem to arise by chance, and the successful ones are selected and re-enforced by conscious attention.

In acquiring a skilled movement kinæsthetic sensations and images often play a very important part. Children learning to dance may be seen at times when no teaching is going on performing fragments of the steps, and even when they are still they may be rehearsing mentally images of the movements. A piece of music may be studied to considerable advantage by placing it on the table before us and *thinking* the movements required. Here, although we do not actually move the fingers, we are forming partially the sensori-motor arcs connecting the appearance of the notes with the necessary movements, and so rendering the passage of the stimulus easier for the future. Each movement gives rise to a complex of kinæsthetic sensations, the excitement accompanying which tends to discharge forward into the muscles which have already made the movement. The visual sensation becomes associated with the kinæsthetic sensations, so that the two aid one another in producing the movement. The attention becomes more and more fixed upon the visual sensations and withdrawn from the kinæsthetic sensations, which seem almost to disappear from consciousness.

[1] *Année Psychologique*, vol. viii. p. 334.

But of the fact that they are still present, in so far that they have an appreciable effect upon our total state, we may assure ourselves by observing how immediately the attention is drawn towards them if any difference in them arises. Thus, if we inadvertently pick up and begin to play with a tennis racquet, of which the handle is a little thicker than that of the one we have been accustomed to use, the slight difference necessitated in the position of our fingers quickly makes itself felt as positive discomfort.

Let us now tabulate the different steps necessary for the acquisition of a skilled movement—for instance, the art of writing:—

1. Presentation of copy.

2. (*a*) Acquisition by experiment and selection of series of resident kinæsthetic sensations required for reproducing the copy, and (*b*) acquisition of series of visual images of the work produced.

3. Combination of (*a*) and (*b*), which comes to take the place of the copy.

4. Control of the kinæsthetic series, seeming always to involve (*a*) attention to the series, (*b*) attention to the representation of the intended result as a whole; (*b*) is the controlling and dominant function. The process of writing has in most of us become secondarily automatic, so that as we go along we simply check the results probably by feelings of familiarity or unfamiliarity with regard to the percepts (words written).

Result (*c*) above (p. 195) calls attention to what are known as "plateaus" of learning. In learning new associations—*e.g.*, in learning typewriting, the amount of work done per unit of time increases rapidly at first, then for a time no progress is made (the plateau period), then

the curve begins to rise again. Watson has suggested that the plateaux are due to lack of incentive. In curves of animal learning, he tells us, where the incentive is kept high by controlling the food and other factors, such plateaux do not occur. He suggests that if in the schoolroom we could find some way of arousing emotion at critical places in learning, we might get the requisite additional incentive. He thinks that the selection of a teacher who is able to fix and to hold the *love* of the child might set free the emotional drive.[1]

That learning goes on in the intervals between practice periods has been shown by result (*d*) above. Numerous experiments have been undertaken to find the most favourable arrangement for practice periods. Starch, for example, has shown that if 120 minutes is to be given to learning, 10 minute periods are somewhat better than 20 minute periods, those than 40 minute periods, which again prove superior to using the whole 120 minutes in one period. Again, Lashley studied the acquisition of skill in archery. His subjects all shot 600 times; one group shot 5 times per day, another 12 times per day; another 20 times per day; and another 40 times per day. The final results of the first of these groups were much the best.[2]

Such facts are very suggestive for schoolroom practice. We have little doubt that, owing to general ignorance of the nature and laws of learning, much of the time now spent by children in schools is wasted or worse than wasted.

§ 8. *Growth of interest.*—If the work that the edu-

[1] *Suggestions of Modern Science concerning Education*, pp. 95-98.

[2] For these and other examples, see Watson, *Psychology from the Standpoint of a Behaviourist*, pp. 385-388.

cator seeks to do in forming the child is to have any stability, it must be broad-based upon his instincts, for instinct-prompted acts are essentially acts we desire to do; they are expressions of the self, and as such are always accompanied by interest (cf. p. 132). Interest as a feeling actually present in the mind arises in an adult, as we have seen, when his accepted ends seem likely to be furthered or hindered; in a child who has as yet not formed his ends the feeling of interest accompanies self-activity, or, what in early years is to a large extent the same thing, instinct-prompted action.

At this point we ought perhaps to allude to the distinction which has been drawn between Immediate and Derived Interest. This distinction is closely analogous to that which has already been noticed in the case of attention (p. 139). At first sight it appears not only obvious, but perfectly well defined. Thus a bright colour is immediately interesting to a child, while a low voice may not be. But if the low voice be its mother's, it becomes charged with a most pregnant interest, being associated with food and fondling and warmth, through which associations it rouses a derived interest far more lively than any immediate interest. It appears then that we have Derived Interest when the feeling is aroused by meaning, Immediate when it is aroused directly by the stimulus. To children, sense stimuli have comparatively little meaning, because of their limited experience; whereas it is a matter of common observation that adults have usually become habituated to disregarding all stimuli except those which have become charged with a special meaning for them. Hence the common-

place that in children interest tends to be immediate, in adults mediate or derived.

But when we come to examine this distinction more closely it turns out to be of little scientific value; for instead of being a distinction of kind, it turns out to be one only of degree. For *meaning* is simply the interpretation of a stimulus according to the constitution of a particular mind. But it is the merest matter of fact that all stimuli are interpreted by the mind; colour and sound, for instance, as such, exist nowhere except in the interpreting mind. Either kind of interest then springs up with the mind's constructive activity, only in the one case the mind's work is greater, in the other less.

The distinction is, however, of some practical importance. All adults have psychological dispositions or interest - complexes, which are roused by certain—often very faint—stimuli. They are apt to forget that their feeling of interest is due to their own mental excitation, and to regard the stimulus as interesting in itself. Thus they often blame their children, or set them down as stupid, because they shrink from topics which rouse in themselves such lively feelings. In the same way a man with a hobby is often a bore. It is given to few to place themselves in the beginner's shoes, and give him a fair opportunity to form an interest-complex for himself.

Of late years much stress has been rightly laid on the necessity of basing education on a study of concrete objects, of teaching things before words. "Appeal to the senses" has been the constant cry

of the educational reformer, and to this cry our educational authorities no longer turn a deaf ear. But we must not apply this rule blindly; we must be guided by the following psychological principles: (1) Any mental act is the product of two factors, one derived from the external world, the other from the mind itself; and all mental development consists in an alteration of the ratio these two factors bear to one another in favour of the latter. The greater the mental factor the greater the feeling of self-activity, and therefore the greater the pleasure. (2) Attention aids perception, as we have seen in our examination of reaction-time, mainly by preparing the ideational centres concerned. (3) Imagination, though founded upon experience, is yet able to transcend it. These three facts seem to us to indicate that we may often advantageously give the ideas first, so that they may be ready, as it were, to pounce upon the things when they are presented. We must, however, see that there is a reasonable chance of the things being presented soon before the ideas pass into oblivion. Let us give a concrete instance of what is meant. A picture of the native boats used in Madras was shown to a class of children. These boats are characterised by the planks being sewed together; and in the picture the stitches were quite visible. When asked if they saw anything peculiar about the boats, the children were puzzled; after some time and several inappropriate suggestions, one bright little girl perceived the stitches, and the rest followed in chorus. Now, had these children had a lesson a few days before on different kinds of

boats, or had the special fact to be observed been mentioned incidentally, probably every one of them would have noticed it at once. A far-sighted teacher is constantly preparing such preperceptions in the minds of his class, and the self-activity thus induced gives the children a foretaste of real intellectual pleasure. The higher forms of interest all depend on the mind's ability to bring a rich store of allied knowledge to the presentation of the object, and to combine the two by exercise of its own activity.

§ 9. *Growth of attention.*—Interest, as we have already seen, always brings with it attention, and it is now universally recognised that the training of a child's attention so that he is not whirled hither and thither by every idle fancy, but is able to hold a self-consistent course amid the many distractions which surround him, is half the teacher's work,—the other half being to secure that the attention thus strengthened be rightly directed.

The objects on which a baby's attention will be fixed are determined congenitally. His attention is attracted by certain noises, certain sights, and other sense stimuli. Such attention lasts for a longer or shorter time according to the interest aroused in the child and the way in which his experience of the stimulus develops. Infants a few weeks old often show a surprising amount of concentration. When this baby power of concentration is not respected children may develop a volatile type of attention, so that their purposes are unstable and may be swept out of their minds by casual sights or sounds. Moreover, few children have much volitional control over their attention; it is of little use telling them they

ought to attend, for they cannot attend unless they are interested. For children under seven teaching should be for the most part on individual lines, offering opportunity for free choice so that spontaneous attention may be called into play. Moreover, since in all but the most complex organisms the natural completion of an incoming stimulus is an out-going one, we ought to recognise that a child's activity is a simple expression of his being which he is powerless to help. To expect a child under seven to "sit still and be good" for long is downright cruelty. Instead of seeking to repress this universal tendency to activity, the educator should make it his tool. Many lessons should be acted instead of simply learned and recited: the making of pictures, maps, plans, models, gives endless scope for activity; indeed, in the case of little children, "Find work for the *hands* to do" is a fundamental rule of discipline. The marked success of the Montessori Method when carried on by a competent Directress is largely the outcome of those psychological principles.

In considering attention in the adult, we noted that it may be divided into three varieties, according to the nature of the object upon which it is directed, and we saw then that these varieties were felt to be of varying grades of difficulty (p. 138). We shall now see that these feelings of difficulty are correlated with the order in which the different forms of object attract the attention of the child. Sense stimuli appeal to it almost from the first, and are of course the only mode of appeal. No other is possible until, in common parlance, the mind contains a store of ideas—that is, until it

develops so as to make an integral part of itself a psychological disposition corresponding to the external world. Hence with little children the only way to gain attention is to appeal to the senses. Even when the mind has in some degree developed, the object of attention must be based on sense stimuli. One reason why arithmetic and mathematics are such excellent instruments for training the mind is that they make unceasing appeal to the sense of sight, because the sense basis of attention changes with every new figure or line set down. All sense training is really training of the attention; it is or ought to be a systematic continuation of the process which Nature begins when she leads the little child tirelessly to seek to make himself acquainted with the properties of the objects which make up the external world. The average child before school age has done wonders for his own education: he has learned a language so that he can use it; he has learned the names and a few of the properties of one or two hundred objects; he has gained considerable command over his own body,—all this he has done by the unceasing use of his attention, which he turns hither and thither as impulse bids him. His knowledge is superficial and faulty, but he is constantly adding to and correcting it, and, best of all, it is his own eager desire which impels him to this process of addition and correction. The school now takes him, and too often, by repressing his natural activities and thwarting most of his instincts, gives him a dislike to the higher exercise of his intelligence, and leads him to concentrate his interests in the playground, where his nature is allowed free scope. And though a better day appears to be dawning, yet the question of how rightly to direct attention so as to avoid this

result is one of the serious practical questions which psychology ought to take up.

The child's attention has hitherto been mainly directed to sensible objects, and these may be said to have taken possession of him almost as truly as he of them. The process is akin to reflex. But the beginnings of the higher forms of attention may be seen in his love for hearing and telling stories, where the object of attention is almost exclusively mental. Such imaginative structures must obviously be within the child's grasp—*i.e.*, must have come within the range of his experience. Hence it is clear that the development of the higher forms of attention can go on only as the knowledge of the child grows. This is the root of the saying that the development of conation depends on that of cognition.

§ 10. *Beginnings of definite volitions.*—When certain acts are repeated again and again, a definite path in the nervous system appears to be established; so that the series following upon the stimulus is carried out like a reflex and with a minimum of consciousness. In this way, as the child grows, habit tends to take the place of impulse, and the way is prepared for the development of the higher forms of will. The attempt has been made to fix the age at which volitional action first appears. The answer depends upon our understanding of the term. If we mean simply action which has a purpose or end, then some observers very plausibly find that the first indisputable examples are to be found in the imitation by the child of some movement made by another. Such imitations occur very early: a baby three or four months old will, for example, purse its lips and blow if it sees you doing so. These imitative movements, however, though showing that the nervous tracks bringing the muscles under the control of

the ideational centres have been already laid down, should be regarded as ideo-motor rather than voluntary. The act is brought before the child's mind in a singularly vivid and persistent form, and, as we have seen, it is characteristic of such ideas when unimpeded to pass outward into action. Even when a child repeats an action, such as hammering the table with his spoon or dropping a toy, we must not too hastily assume that the repetition is a sign of conscious purpose, as it usually would be in an adult. After the first action has taken place the sensori-motor arc, which represents the course of the stimulus, will be in a state of heightened excitability; and when the same stimulus is applied again—say, by putting the toy into the child's hand—it naturally follows the same path; thus the repetitions may be continued until fatigue of the centres sets in, which condition is marked by a decrease of ability to transform a sensory stimulus into a motor one. All this time the child may show pleasure in the result of the act—*e.g.*, in the noise made by the falling toy—and yet may feel himself rather a spectator than an actor. Doubtless at an early period in such acts the child does foresee and desire the end, and throwing himself forward with the desire, becomes in this sense an actor; but by no outward sign can we fix the precise moment of this development. On the other hand, when a biscuit or piece of cake is held up to a child, and he promptly seizes it and puts it in his mouth, we can scarcely refuse to believe that he is actuated by desire in the full sense of the term—*i.e.*, that the sense stimuli proceeding from the cake rouse in him a vague notion of "good-to-eat," and that he is endeavouring to re-enforce this notion with the actual sensation. The beginnings of memory are apparent here, and it becomes clear that

memory is a precondition of even such an elementary form of volition.

In all these early instances the end desired is in the immediate present, and when it is attained desire ceases; moreover, desire is awakened by a stimulus of the moment, and for some considerable time it remains on this perceptual level. Nevertheless, as the end of desire—no matter what the stage of development—is always some experience of the self, so it comes about that the early desires are important factors in building up the idea or the psychological disposition underlying the idea of the self, without which any high level of development would be impossible.

§ 11. *Complex volition.*—In the higher forms of desire memory-construction comes to play a more and more important part, while the sensory stimulus sinks to a minimum. For example, a child sees you preparing to go out, and desires to be taken a particular walk; he desires, moreover, to go one special way, to find certain flowers in certain places, and so on; so that his desire takes form in his mind as an intellectual construction of a very definite series of sensations which he desires to experience again. Further development on the same lines is apparent when the child desires experience he has never had. The story of the little boy who, when questioned as to what he most wished Santa Claus would bring him, replied, "A baby sister and a desert island," is a case in point. Here constructive imagination is coming into play (ch. xiii.)

The acts so far examined have been comparatively isolated. They have all, it is true, consisted of series of movements directed by one guiding plan. But it is evident that a higher stage still is attained when a whole succession of such acts is undertaken in obedience to

one dominant purpose. Thus when a child writes a letter every week to her parents in India, a unity is apparent in her life which is quite different from anything we have yet considered. Similarly acts undertaken to win approbation or "because they are right," show that relatively permanent psychical dispositions are being laid down which re-enforce some desires and inhibit others. The establishment of such rules of conduct shows that the child is approaching the volitional life of an adult, in which innumerable distinct acts are all subsumed under one purpose, and many desires are of such a nature that they cannot be satisfied in years or even a lifetime, but remain as an abiding part of the self.

The conflict between incompatible desires serves to define and strengthen these dispositions and to arrange them in a sort of hierarchy. Thus in the case imagined above, some great treat, such as a visit to the theatre, may be allowed to come in the way of the weekly letter. Afterwards, when the glamour of the temptation is past, the child's remorse, as she thinks of her mother missing the accustomed mail, may so strengthen her resolve to write regularly that no future counter-attraction may be seriously felt as a temptation. Yielding is thus sometimes more strengthening to character than resisting; for along with resistance there sometimes goes a dwelling on the pleasure we have denied ourselves, which actually strengthens its hold over us and renders us more likely to succumb on the next occasion. Possibly Browning had this strange fact in view when he wrote—

> "The sin I impute to each frustrate ghost
> Is the unlit lamp and the ungirt loin,
> Though the end in sight be a vice, I say."

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[1] "The Statue and the Bust."

We have dwelt chiefly on intellectual development as complicating the life of desire, but emotional development is obviously no less potent. On adolescence, for instance, the widening of the social horizon brings with it a host of new desires which often so overpower the old ones that sometimes the whole personality appears to be altered. Nothing is more remarkable, nothing to the inexperienced more alarming, than the storms of passion which sweep over the young man or maiden at this time; nothing more startling than the way in which they pass. Vows are piled on vows, and when the morrow comes where are they? You remember how, when Benvolio suggests—

> "Go thither; and, with unattainted eye,
> Compare her face with some that I shall show,
> And I will make thee think thy swan a crow,"

Romeo responds—

> "When the devout religion of mine eye
> Maintains such falsehood, then turn tears to fires;
> And these, who often drown'd could never die,
> Transparent heretics, be burnt for liars!
> One fairer than my love! the all-seeing sun
> Ne'er saw her match since first the world begun."

And all this, be it remembered, refers not to Juliet, but to Rosaline. Again, before the ball begins, he declares—

> "I'll be a candle-holder, and look on.
> The game was ne'er so fair, and I am done."

Half an hour later this worn-out life-weary youth is hanging on Juliet's loveliness:—

> "Did my heart love till now? forswear it, sight!
> For I ne'er saw true beauty till this night."

What is the explanation of this? Romeo himself supplies it:—

> "Tut, I have lost myself: I am not here;
> This is not Romeo, he's some otherwhere."

Far down in the mysterious depths of the personality the self is slowly crystallising out, marvellously little affected by these storms, which, violent as they appear, after all lash only the surface into waves. The wisdom of ages has recognised this, and does not balance youth's account too strictly. "Boys will be boys," and "young men must sow their wild oats"; but a wrecked or maimed life may result when the crop of wild oats is such that the *man* cannot trample it beneath his heel.

In a young child, when opposing impulses arise, there is a quasi-mechanical contest between them, and the strongest carries the day. Adults sometimes experience such a state when two opposing courses are open to them and they have no very decided reason for following either; they feel impelled first to one, then to the other, and in pathological cases the forces may be so evenly balanced that action is prevented altogether. As a rule, however, the tendencies within the dispositions are so numerous and so far-reaching that every suggested course of action is either helped or hindered by them. The very perception of the folly of hesitation acts as a spur to the impulse which happens to be uppermost at the moment and hurries it to completion.

We may now ask, Does the development of Volition resolve itself entirely into that of Cognition and Emotion? Is there no real development of conation? and, if not, what do we mean by strength of will? In children and in men and women of every age we have

all met the quality that is known as obstinacy. Of late years many educators have begun to assert that obstinacy does not denote strength of will but weakness. This statement, however, presents only part of the truth. In a child's obstinacy there is both strength and weakness. The weakness consists in this, that the child's knowledge and experience are both so limited that the reasons you have for making him do something would find no responsive stir in his mind and need not be presented to him; the strength in this, that a fit of obstinacy is a strong assertion of that self of which the child is just beginning to become conscious. Now this strength of assertion, this throwing of all our powers into the carrying out of our purpose, is certainly an element in strength of will. It is, moreover, the primary element, the only one which a child can exhibit until he has formed his permanent ends. It is in some degree the same quality as perseverance; although, as its name denotes, its most prominent characteristic is the joy the young rebel feels in measuring his strength *against* that of another. The second factor in strength of will is persistency of desire, combined with the practical recognition of the fact that gratifying one desire means the inhibiting of a number of others. This persistency of desire seems to be innate in some minds, and is perhaps correlated with a physical basis similar to that which underlies a naturally retentive memory. Even when we are not blessed by this natural gift, our larger desires become so inwoven with our lives as a whole that we cling to them even after the first bloom of their attraction has passed away. Our pride—the dislike of being beaten or of appearing changeable—is enlisted as a motive. The habit of working with a particular end

in view establishes itself, and makes it easier to continue than to cease; so that altogether a fair imitation of persistency of desire is established in most lives. Still it is in many cases only an imitation, and we have little doubt that much of the temperament of genius consists in the keeping alight the lamp of desire, so that the zest with which the spirit leaps towards the fulfilment of its life's purpose continues unabated till the end.

These differences of intensity do seem then to belong explicitly to the active side of our nature, but the increase of intensity which comes with growth is clearly seen to be due to the great influx of motor ideas which the widening of experience brings. Thus not even on this side is there any development of conation apart from that of the mind as a whole.

§ 12. *What is the essence of the conative process?* —We see the conative process in its most intense form in states of desire, and at times when we are working for the gratification of our desires. When we imagine our activity in most vivid form, we are apt to think of it as bodily effort, as raising a weight, opening a door against resistance, &c. We cannot, indeed, take any effectual action in the world at all without using our body as an instrument; if we have any reform at heart we must go to committee meetings, we must stand up and speak, we must write letters, we must bestir ourselves to seek out other men and urge our wishes upon them,—and all these things involve muscular innervation. "If the muscles are undeveloped or grow relaxed and flabby, the dreadful chasm between good intentions and their execution

is liable to appear and widen."[1] The pen is said to be mightier than the sword, but to wield the pen involves muscular action no less than to wield the sword. When we write, there is continual adjustment of the eye no less than of the hand. When we simply think, we often think in words,—a process which, in most people, involves nascent articulation which may easily pass into "thinking aloud." When I forecast the course of a game of chess, I find myself silently saying, "If I do *that*, he will do *that*, then I shall do *that*"—and the emphasised "thats" seem to act as nails which fix the new state of affairs resulting from the supposed moves in my mind; no visual image of this new appearance of the board accompanies the conception. But even when thinking has not this evident accompaniment of muscular innervation involved in articulation, when it consists, for example, of series of visual images, many people maintain that motor adjustment is still its necessary concomitant: they maintain, indeed, that this adjustment is really the essential part of the process, that it is actually the essence of what we know as mental activity or attention. Bain and Professor Ribot may be mentioned as among the best known upholders of this view. To make clear this conception of the matter—which is of course diametrically opposed to that popularly held—we quote the following passage cited by James from Lange:—

"Let my reader close his eyes and think of an extended object,—for instance, a pencil. He will easily notice that he first makes a slight movement [of the eyes] corresponding to the straight line, and that he often gets a weak feeling of innervation of the hand as if touching the pencil's surface. So in thinking of

[1] Stanley Hall, *Adolescence*, p. 131.

a certain sound, we turn towards its direction or repeat muscularly its rhythm, or articulate an imitation of it."[1]

The contention is that the movement is first made, and as a consequence the thought of the pencil results; the passage quoted will serve merely as a sample to show the kind of evidence which is brought forward in support of this doctrine. The tendency of the theory is (1) to reduce attention to a reflex phenomenon in accordance with what Ribot calls "the fundamental principle of physiology, that reflex action is the type of nervous action and the basis of all psychic activity";[2] (2) to reduce the mind to a sensation-complex—*i.e.*, to maintain that sensations, perhaps accompanied by affective quality (pleasure-pain), are the material out of which the mind is constructed, and that self-activity in any real sense of the term is not to be attributed to it.

The great stress that this theory lays on motor phenomena is perhaps justified by considerations such as those brought forward at the beginning of this section. We shall, however, attempt to show (1) that attention is, as a matter of fact, not always accompanied by actual muscular adjustment, and hence cannot consist in its essential nature of that adjustment; and (2) that if the theory is modified so as to maintain that motor images accompany all thought, and form the essence of attention, yet that other sensory images—from which, indeed, they differ in no way except that the cerebral excitement accompanying them tends more directly to overflow into the muscles—may

[1] James, *Principles of Psychology*, vol. i. p. 444; cf. also Sully, *Human Mind*, vol. i., ch. vi., § 4*b*.

[2] Ribot, *Diseases of Personality*, p. 13.

equally well be the accompaniment of the process of thought.[1]

Let us first consider whether visual imagery depends, as Lange thinks, on ocular movements. With a view to answering this question, Professor James asked his students to experiment with imagined letters of the alphabet and syllables, and they reported that they could see them inwardly as total coloured pictures without following their outlines with the eye. He himself is a bad visualiser, and makes movements all the time. I found on experiment that I could easily imagine tall trees towering over my head without feeling the slightest tendency to movement. I then closed my eyes, put my fingers on the lids, satisfied myself that I could thus feel any movement of the eyeball, and imaged a large circle; I could not detect by any means that the eye tended to follow its outline. I then attempted to image a bird flying across the room in one direction, while I turned my eyes in the other. There seemed some hesitation about this at first, but in a few seconds I was able to execute the required combination fluently. The reader is advised to repeat and test all these experiments. I have asked friends whom I knew to be good visualisers to make similar trials, and their results agree with mine. The conclusion seems to be that movements are certainly not an essential concomitant of attention to visual images.

If we now turn to the nascent articulation which accompanies so much of our thinking, we shall, I believe, come to the same conclusion with respect to it. This nascent articulation is often accompanied by slight

[1] This conclusion would lead directly to the question, Is imageless thought possible? For a consideration of this question see ch. xiv.

movements of the tongue and lips; but I find that if I close my lips firmly, and press my tongue against the roof of my mouth, the succession of articulatory images is not interfered with. Some of the writers who uphold the theory now under discussion, maintain that it is impossible to imagine such a word as "bubble" when the mouth is held wide open. Now not only do I find it possible to get a perfectly clear articulatory image of the word "bubble" in the circumstances mentioned, but I can image it or any other word while actually using the muscles (supposed to be involved) in repeating aloud some automatic series, such as the numbers one, two, three, &c.[1] The articulatory images of words then stand on a par with visual images, and we must suppose that the excitement of the brain cells, which are active when these images are in the focus of consciousness, does not necessarily pass out of the cerebral centres in such a way as to innervate the muscles.

The only constant concomitant of the thought-process is, then, cerebral activity, and no one, whatever his metaphysical opinions, would now think of denying the invariable presence of this factor.

When we attend to outward things there is a reflex or automatic adjustment of the sense organ concerned, and there is a heightening of tone in all or most of the muscles; the tense attitude characteristic of attention is well known. But if we agree that these muscular concomitants are not essential to attention, then we may expect to find the clearest expression of its nature in

[1] Some investigators have found that nascent articulatory movements which are not detected by introspection may be demonstrated by the use of an instrument. This does not of course prove that such movements are always present, nor does it impugn the conclusion drawn from the above experiment.

cases where such muscular adjustments are not necessary —*i.e.*, when we attend not to outward but to inward things. It occasionally happens that when we are engaged in worrying out some problem of abstract thought—*e.g.*, the very one that occupies us at present, namely, the intimate nature of the attention process, we wake in the morning to sudden and intense mental activity directed on this subject. Our eyelids, our limbs lie heavy and inert—no movement whatever takes place, any one entering the room would imagine that we were deep in slumber; but our thoughts are keenly active. Now this activity seems to consist—so far as we can describe it—in the holding of a certain thought-complex or congeries of related ideas in the focus of consciousness, and so encouraging it to develop. This development is like a process of growth; other ideas related to the central ones appear, some are welcomed and mingled with the original ones, and the aspect of the whole is thus changed; others are rejected as not furthering the end in view, and pass out of existence again. During the whole time the question is kept in view as indicating the unknown goal to which we wish to attain. The process is accompanied by an intense feeling of self-activity; when an explanatory hypothesis rises in the mind we seem to make active search for illustrative examples, we test them by the suggested hypothesis, and feel that it is strengthened or weakened by the result. Our aim is to reduce all events of a certain type (in the special case considered,—all individual acts of attention) to unity by subsuming them under one general law. If we are successful, then, the end being attained, the turmoil ceases. Now this general law which we are seeking, and which we feel will introduce consistency and clearness into the chaos

of facts, does not in any real sense exist in these facts; it is a construction of the mind, and the endeavour after it is simply an expression of the mind's faith that the whole universe is constructed on lines which are in harmony with its own nature. This faith has found its justification in the great edifice reared by science, which we may figuratively regard as the slow yielding of the universe to the demands of the human reason. It is the mind, by its own activity, that leaps from the distinct and separate facts to their summation in the general law; and again, it is the mind which judges whether or not the general law does satisfactorily combine the particular facts. The mind is active, as we shall see later, in building up even the fragmentary world of perception; much more is it active in building up the conceptual world of science.

In connection with the general subject of this chapter, see also chap. iv., § 7 above (p. 95), and McDougall, *Outline of Psychology*, ch. ix. ("Attention and Interest"). For an analysis of the conative process and a discussion of its relation to motor sensation and affective consciousness, see Stout, *Brit. Jour. of Psy.*, July 1906; and cp. also Spearman, *Nature of Intelligence and Principles of Cognition*, pt. ii., ch. iv., p. 53.

CHAPTER VIII.

THE EMOTIONS.

It is easier to give instances of the different kinds of experience called "emotions"—fear, anger, hope, despair, and the like—than to define the qualities which these states have in common and which lead us to apply the same name to them all. At the outset of our inquiry we must be satisfied with the merely provisional description of an emotion as a state of mind characterised predominantly by feeling and activity, aroused by the perception of certain specific objective conditions or specific free ideas of memory and imagination.[1]

§ 1. *Psychological qualities of the emotions.*—In connection with the treatment of feelings at different levels of mental life (internal sensation, external sensation, perception, and ideation) some psychologists seem to fall into a serious logical blunder. For instance, we find Ribot quoting with entire approval the following passage from E. von Hartmann: "When I have pain in my teeth or my finger or my stomach; when I lose my wife, my friend, or my situation, if in all these cases we distinguish what is pain and pain alone, and is not to be confounded with sensation, idea, or thought, we shall recognise that this special element is identical in all the

[1] We say "specific," because, as we shall see, particular kinds of emotion are aroused by particular *types* or *kinds* of objective situation.

cases."[1] And Külpe says: "There is no qualitative difference discoverable between the pleasantness of colour and that of a successfully concluded argument, when careful abstraction is made of the very wide differences in all the attendant circumstances."[2] All such statements involve the logical blunder of putting forward *a statement about the meaning of an abstract term* as if it were *a statement about facts.* To say that there is no difference in kind (for example) between the pain of a great grief and the pain of toothache, is only to say that the abstract term, pain, means the same thing in the two cases; in fact, it is only to say that the abstract term has a definite and fixed meaning,—that "pain is pain." But the *abstractions*, pleasure, pain, do not exist. The pleasures and pains which do exist have special characters due to the psychological and physiological context in which each occurs.

Alice in Wonderland met with a cat whose countenance invariably wore a "grin"; and this cat was liable to vanish suddenly. On one occasion, however, the cat "vanished quite slowly, beginning with the end of the tail, and ending with the grin, which remained some time after all the rest of the cat had gone." What is possible in the world of "Wonderland" is not possible in any other world. In the world of mental life, a pleasure or a pain can be distinguished from its context, but when so distinguished it has no existence, any more than in the physical world a "grin" exists abstracted from a "cat."

We shall see in chapter ix. that even the pleasures and pains of comparatively simple sensations have special characters and qualities owing to the diffused physiological effects aroused by the stimulus. At

[1] Ribot, *Psychology of the Emotions*, p. 42.
[2] *Outlines*, p. 231.

higher levels of mental life, new factors enter into the "context" of the feeling; and every actual feeling or emotion, above the level of organic sensation, is dependent on some group of primary or revived presentations, which, together with the reactions of organic sensation and the induced movements of attention, gives to the feeling a specific quality of its own. Hence—to return to our previous illustrations—the "pain of a toothache" and the "pain of a great grief," or the "pleasantness of a colour and that of a successfully concluded argument," do really differ in mental quality; because "the very wide differences in all the attendant circumstances" do really make a difference in the pain, or in the pleasure, as the case may be.

This is not to make "an ethical valuation unjustifiably determine a psychological conception" (Höffding, p. 221). The distinctions of quality, on which we have insisted, are psychological facts. It is possible that some of them may be capable of an ethical interpretation; but that is hardly a reason for denying their existence. It is, of course, no business of psychology to make such interpretations.

§ 2. *Structure of an emotion: analysis of Fear.*—In order to understand the component factors of an emotion, and the psychological problems to which they give rise, we take as an *example* the case of *fear*, which we analyse, taking it at a stage of mental growth represented by the adult human mind.

We first quote from Charles Darwin an account of the bodily symptoms of fear.[1] "The eyes and mouth

[1] If the account seems exaggerated, the reader should remember that in civilisation it is possible to pass through life without any experience of genuine fear. Professor James remarks that many of us would need an attack of mental disease to teach us the meaning of the word. The passage is from Darwin's *Expression of the Emotions*, 2nd ed., ch. xii. (pp. 306-309 of the popular edition).

are widely opened, and the eyebrows raised. The frightened man at first stands like a statue, motionless and breathless, or crouches down as if instinctively to escape observation. The heart beats quickly and violently, so that it palpitates or knocks against the ribs; but it is very doubtful whether it then works more efficiently than usual, so as to send a greater supply of blood to all parts of the body; for the skin instantly becomes pale, as during incipient faintness. This paleness of the surface, however, is probably in large part or exclusively due to the vaso-motor centre being affected in such a manner as to cause the contraction of the small arteries of the skin. That the skin is much affected under the sense of great fear, we see in the marvellous and inexplicable manner in which perspiration exudes from it. This exudation is all the more remarkable, as the surface is then cold, and hence the term "a cold sweat"; whereas the sudorific glands are properly excited into action when the surface is heated. The hairs also on the skin stand erect, and the superficial muscles shiver. In connection with the disturbed action of the heart, the breathing is hurried. The salivary glands act imperfectly; the mouth becomes dry. . . . One of the best marked symptoms is the trembling of all the muscles of the body; and this is often first seen in the lips. From this cause, and the dryness of the mouth, the voice becomes husky or indistinct, or may altogether fail: *obstupui, steteruntque comæ, et vox faucibus hæsit*. . . . As fear increases into an agony of terror, we behold, as under all violent emotions, diversified results. The heart beats wildly, or may fail to act, and faintness ensues; there is a death-like pallor; the breathing is laboured; the wings of the nostrils are widely dilated. . . . The uncovered and protruding eyeballs are fixed

on the object of terror, or they may roll restlessly from side to side. The pupils are said to be enormously dilated. All the muscles of the body may become rigid, or may be thrown into convulsive movements. The hands are alternately clenched and opened; the arms may be protruded, as if to avert some dreadful danger, or may be thrown wildly over the head. In other cases there is a sudden and uncontrollable tendency to headlong flight.

The *object* of the emotion of fear (that is, its exciting cause, to which it has reference) is a situation in which the individual finds himself, and which is *perceived or imagined to be* one of impending or imminent evil or disaster.

Its *bodily symptoms*, as described above, arise from a withdrawal of energy from the organic processes (and from some muscles—*e.g.*, those of the jaw and lips), and the concentration of energy on muscular movements and certain intellectual processes; hence occurs a pervading shock of internal depression.

On the *mental side* there is first of all a central process—the perception or idea of myself in this situation. The volitional energy is concentrated in the muscular movements and in an intense occupation of the thoughts with the dreaded situation (*i.e*, on the perceived objects and the allied ideational trains). We are affected with a massive discomfort, due to a combination of feelings of abnormal internal depression and abnormal excitement. Other more purely mental pains supervene owing to the conflict of these elements of thought, volition, and feeling.

This description of fear, though taken at the level of human life, corresponds closely to the "animal" type of the emotion. It is the immediate outcome of a practical situation which involves an imperative demand for

practical adjustment in view of an emergency, together with more or less of felt incapacity to deal with the situation effectively. Professor Stout has pointed out that fear arises not only in connection with imminent evil or disaster, but also from "the startling or disconcerting effect of a strange, sudden, or violently obtrusive occurrence." The fear arising from the presence of a supposed apparition from another world is entirely of this kind.

When the cognitive processes are in an elementary state, because they are undeveloped (as in the animal, the savage, or the normal child), or because they are suppressed (as in some wild passion of fear, such as rarely occurs), the instinctive bodily manifestations of the emotion may be of overwhelming force. Rudyard Kipling, describing one of the sudden panics to which even British troops are liable, makes one of the fugitive soldiers say—

> "Till I 'eard a beggar squealin' out for quarter as 'e ran,
> An' I thought I knew the voice—an' it was *me!*"

This represents a falling back into the purely instinctive passion of fear in all its intensity, as when a frightened dog runs and yelps—a passion which the distinctively *human* consciousness in the man only becomes aware of by its bodily symptoms when he recognises the sound of his own voice.

Corresponding to a higher level of mental life, is the more intellectualised form of fear which is contrasted with hope, and which involves distinct memory and imagination. It is the *expectation* of evil. It implies a high degree of assurance (short of the highest) that some undesired event is likely to occur, or that some desired event is unlikely to occur, "as in the

chances of a storm, a severe illness, an unequal contest for a great stake." The organic reactions and mental distraction make this a dangerously depressing force, which itself helps to incapacitate us for successful struggle against the impending danger.

We have already observed that in any scientific exposition of psychology it is necessary to isolate distinctive types of mental process and treat them as if they existed independently of other processes, while in reality they never do so exist (unless in certain kinds of mental disease). Normally there are no such things as "emotions" in this sense, any more than there are such things as "sensations," or "ideas," or "concepts." The use of the substantival form "does not imply a thing or agent, but always a mode or quality of experience" (McDougall, *Outline*, p. 315). Cp. ch. ix., § 1 below (the corresponding consideration in reference to "sensation").

§ 3. *Structure of emotion: general statement.*—Every emotion has the two sides, bodily and mental. We can distinguish the following factors in the emotion:

On the mental side:

(*a*) the perception (or imagination or memory) of a situation in which the individual finds himself, and which affects his material, mental, social, or higher interests.

(*b*) an affective quality, tending towards pleasure or towards pain.[1]

(*c*) a tendency to activity.

(*d*) a complication of organic sensations.

[1] We say "tending towards," in order to cover the case of emotions which may arise without definite affective quality—*e.g.*, surprise.

On the bodily side:

(*e*) diffused internal changes, cf. (*d*) above;
(*f*) muscular movements, cf. (*c*) above.

The factors (*a*), (*b*), (*c*), (*d*) are elements in, or aspects of, a single state of consciousness which, as a whole, is called an emotion. They are not all equally prominent in every emotion. The most intimate connection of the emotion with the body occurs through (*d*) and (*e*). The bodily factors (*e*) and (*f*) are together called the *expression* of the emotion. The expression of the emotion is in psychology understood to mean *all* the bodily changes that occur in connection with it; facial expression is only one part of it, and concerns the facial muscles alone.

In describing any emotion, the following points should therefore be attended to:—

(1) The nature of its object (the kind of situation which, when perceived, imagined, or remembered, arouses it).

(2) Its affective quality: pleasant, painful, or practically indifferent; the massiveness or volume of the affection; its normal intensity.

(3) Mode of influencing the will (active tendencies involved).

(4) Bodily expression: (*a*) internal organic sensations, (*b*) muscular movements.

(5) Different modifications of the emotion (if any) at different stages of mental development.

We shall see that an emotion of the same type may occur at any level of experience, from the lowest forms of perceptual consciousness to the highest forms of ideational and conceptual activity; and that, corresponding to this wide

mental range—as we may call it—of the emotion, is the varied nature of the conditions that may arouse it: *any* kind of *danger* may excite fear. "It is a general kind of situation, not a specific class of objects, which excites a certain kind of emotion; and the behaviour in which emotion finds expression is correspondingly general in character. It is not an adaptation to this or that specific object, but a general mode of action adapted to a certain kind of situation" (Stout, *Manual*, 3rd ed., bk. iii., ch. v., § 1). If this statement is to be always true, we must stretch the meaning of the word "adapted" almost so far as to make it include its opposite. In violent fear, for example, "the graver the peril becomes, the more do the reactions which are positively harmful to the animal prevail in number and in efficacy. . . . In the face of such facts we must admit that the phenomena of fear cannot all be accounted for by 'selection.' . . . We might almost say that nature had not been able to frame a substance which should be excitable enough to compose the brain and spinal marrow, and yet which should not be so excited by exceptional stimulation as to overstep in its reactions those physiological bounds which are useful to the conservation of the creature." (Mosso, quoted by James, *Principles of Psychology*, vol. ii. pp. 483, 484).

This brings us to an observation which Mr A. F. Shand has made fundamental in his account of the emotions, and which prevents his accepting without qualification Professor McDougall's theory that the primary emotions are "essentially indicators of the working of instinctive impulses" (*Outline of Psychology*, 2nd ed., pp. 324, 325). Emotion shares the nature of all mental life in having an impulse and an end, in relation to which other mental constituents tend to become organised. An emotion is therefore (in Mr Shand's terminology), a *system* which may contain several innate instinctive or other active tendencies (see Shand, *Foundations of Character*, 2nd ed., pp. 20-25, 178-180, 185-192). Professor McDougall finds that his own view can be maintained only by limiting the name "emotion" to the so-called "primary" and "blended" emotions, and allowing it to the "derived" emotions (*op. cit.*, p. 338; cp. p. 331) only as a concession to popular usage (see § 6 below).

It follows, from what we have said, that any attempt to arrange emotions in classes according to the extent and intensity of the organic reactions which accompany them, is psychologically irrelevant, if not misleading. Thus, Professor James and others have distinguished as "coarser" those emotions where the organic reactions are comparatively vigorous,—such as anger, fear, love, hate, joy, grief, shame, pride, and their varieties—and as "finer," or "subtler," those where the effect on the internal organs is comparatively weak,—such as the intellectual, æsthetic, moral, and religious feelings, and their varieties: curiosity, relief on solution of a problem, gratitude, reverence for a higher moral life, and many like modes of feeling. The fact is that such a distinction is important only to those who hold a particular theory which is not generally accepted, but which Professor James revived and made famous by the brilliancy and vigour of his advocacy: the theory that the characteristic quality of an emotion is simply the feeling of its organic "expression."[1]

Professor McDougall has called attention to the fact that "we do not become explicitly aware of our emotions, so long as we give ourselves wholly to action," and are absorbed in the pursuit of our goal and the choice of means towards it: but the emotion is present and qualifying all the experience. We would go further than McDougall and affirm that it is the driving power of the whole experience.

§ 4. *Emotion and Sentiment.*—We hold that analysis of organic and instinctive tendencies is no clue to the part really played by emotion in mental life. The very meaning of the problem only begins to be apparent

[1] To this we return below (§ 6).

when we follow up the distinction between an *emotion* and an *emotional disposition*,—or "sentiment," as i is now usually called, using the word in a technica psychological sense.

The emotion is the state of mind as it is consciousl felt; the sentiment is the emotional disposition ou of which it arises. The simpler forms of sentimen produce only one kind of emotion; in its more develope forms the same sentiment can produce many kind of emotion. It is, to begin with, a psychological dis position (ch. iv., § 4) towards a certain object. It show itself in different ways according to the relations int which that object may enter. Hence (*a*) it canno be all felt at once, and (*b*) it requires the developmen of ideation (memory, imagination, knowledge). Thus *friendship* is a highly developed sentiment. It is "a general susceptibility to manifold kinds of emotion varying with circumstances; it is manifested in th *sorrow* of parting with one's friend, the *joy* of meetin him after prolonged separation, *jealousy* of those wh engross his interest so as to exclude us from it, *hop* for his success, *fear* when he is in danger, *anger* against his enemies."[1] All these emotions belong to the sentiment of friendship, but they cannot all be felt at once. The sentiment itself might be described as the permanent *condition* of these varying phases of emotion. Friendship is an example of an acquired disposition. In ordinary language, the words "love" and "hate" stand for acquired dispositions of this sort. A comparatively simple sentiment or emotional disposition is the result of frequent indulgence in a particular emotional state, as anger. This fixes and

[1] See Baldwin, *Dictionary of Psychology*, vol. ii. p. 521.

strengthens an emotional habit,—a disposition to that mode of feeling.

The intellectual, ethical, æsthetic, and religious emotions are the manifestations of deep-seated and complex sentiments which are characteristic and distinctive of human life. In a suggestive passage Höffding shows the importance of these: "A feeling may be very strong and deeply-rooted without being violent, but is then more easily overlooked. The feelings accompanying ideal aims and relations are far less in a position to produce momentary effects and sudden ebullitions than are the primitive feelings accompanying the physical vital functions. In the passions associated with self-preservation and the propagation of the race there lies an animal ardour which is often beyond the control of all other influence. Ideal feelings are spread over a larger space of time, and take effect more secretly. And yet they are capable of possessing themselves step by step of the central position in the mind, and of employing in their service the accumulated energy originally under the control of those primitive impulses."[1]

We have shown how by habitual indulgence in an emotion we may establish a *disposition* to feel it. How is this related to the experience that "custom blunts feeling"? These statements do not conflict; for the latter has reference only to the case where the pleasurable or painful circumstance is an approximately constant element in our life, without the freshness that periodic cessation and recurrence can bring. "Our permanent surroundings and manner of life tend to grow indifferent—that is, to lose all or most of their affective concomitants." This "gradual abatement of feeling with permanence and custom" is not-

[1] *Outlines*, p. 95.

ably illustrated in the case of emotion. In this connection Mr Sully refers to the blunting of the sentiments of delicacy and horror in such cases as the gravedigger in *Hamlet* or the sexton in Scott's *Bride of Lammermoor*, and to the known effects of the frequent shaming or ridiculing of children in producing obtuseness of sensibility.[1]

This possibility of growing indifferent to *permanent circumstances* does not conflict with the fact that by the indulgence of feeling habits of feeling may be formed, just as habits of conduct may be by bodily actions. Hence it has been said that "feeling is the conservative element in mental life." But all such generalisations are unsafe. The "ideal feelings" or sentiments referred to at the end of the last section (§ 3) are progressive as well as conservative; they lead to the acquisition of new material as well as the retention of the old. But there is no doubt that sometimes a feeling will not expand beyond its original object, and so brings about a kind of *inertia* in mental life, which in special cases helps to retard and hinder progress in thought and life.

A feeling may persist after its original object has ceased to exist. Thus, an emotion of remorse may continue to follow on certain actions, even after a fully rational examination has convinced us that they are morally innocent; a sentimental regard may keep us attached to institutions after we know them to be worthless, or to persons after we know that they have utterly ceased to deserve it. More innocent forms of the survival of former feelings also are constantly found. When meeting one's old schoolmaster, after many years, one almost unconsciously feels a survival of the former re-

[1] *Human Mind*, vol. ii. p. 34.

gard,—one feels a kind of deference which is not strictly required in the new circumstances. In the closing scene of *The Mill on the Floss*, George Eliot has inserted a touch showing how the old feeling of child-comradeship between Tom and his sister returns, together with the unpremeditated use of the old pet name: "It was not until Tom had pushed off and they were on the wide water—be face to face with Maggie—that the full meaning of what had happened rushed upon his mind. It came with so overpowering a force—it was such a new revelation to his spirit, of the depths in life that had lain beyond his vision, which he had fancied so keen and clear—that he was unable to ask a question. . . . But at last a mist gathered over the blue-grey eyes, and the lips found a word they could utter: the old childish 'Magsie!' . . . The boat reappeared, but brother and sister had gone down in an embrace never to be parted: living through again in one supreme moment the days when they had clasped their little hands in love, and roamed the daisied fields together."

That feeling even on the ordinary levels of mental life is not merely conservative, may be illustrated by pointing out its effect in impelling the thoughts beyond the limits dictated by fact. Thus a particular emotion may (as it were) persist in seeking further food for itself, and so lead us to over-estimate or under-estimate the whole character of a person, or the whole meaning of a course of events, simply because some particular detail affects us in a special way. What is called the "idealising effect of feeling" is a noteworthy illustration of this tendency, but at a level where the mere charge of "illusion" is not applicable; thus, practical and ethical interests may prompt the formation of the image of an

ideal world from which the imperfections and sufferings of the actual world are removed.

The foregoing account of emotional dispositions leads naturally to the subject of the following section.

§ 5. *Psycho-analysis.*—Psycho-analysis is originally, as the word implies, a mode of analysing the mind. Primarily it was a method of medical treatment for hysterical patients, and was discovered about 1881 by Dr Josef Breuer, a Viennese physican. The particulars were not, however, published till 1895, when there appeared *Studien über Hysterie* by Breuer and Freud conjointly. Since then Freud has given his life to working out the psychological implications of the phenomena revealed by the application of the method. It is to the theory thus developed that people refer when they speak of psycho-analysis as a "new psychology."

Approaching the matter as he did, from the medical side without any training in normal psychology, or apparently in philosophy, it was to be expected that Freud would promulgate some theories that would not stand the test of criticism, and would even refurbish some which were already riddled by criticism. He has, nevertheless, especially in his early work, always kept closely to his facts, and has never hesitated to modify or drop a theory when he saw the facts would not fit it. The greatest contribution that he has made to psychology is perhaps to be found in his doctrine of Repression. Hysterical symptoms, according to the discoveries made by Breuer and Freud, are rooted in experiences which have been forgotten by the patient, but which are still latent in his mind, and effective. If these memories can be dragged up into consciousness then the patient is able to face them and to rob them of their power. In every hysterical case that he treated, Freud found that

"a wish had been aroused which was in sharp opposition to the other desires of the individual, and was not capable of being reconciled with the ethical, æsthetic, and personal pretensions of the patient's personality. There had been a short conflict, and the end of this inner struggle was the repression of the idea which presented itself to consciousness as the bearer of this irreconcilable wish. This was then repressed from consciousness and forgotten. The incompatibility of the idea in question with the 'ego' of the patient was the motive of the repression, the ethical and other pretensions of the individual were the repressing forces. The presence of the incompatible wish, or the duration of the conflict, had given rise to a high degree of mental pain; this pain was avoided by the repression. This latter process is evidently in such a case a device for the protection of the personality."

This passage, quoted from lectures on the subject delivered in America by Freud in 1909, is deserving of very careful study, for we can detect in it almost all the main concepts of the psycho-analysts.

An excellent illustration of the kind of unwelcome wish that Freud discovered to be at the root of his patients' troubles, is found in Walter de la Mare's *Memoirs of a Midget.* At a time after her parents' death, when the "Midget" was thinking over the way in which life had opened up to her in consequence, "a voice," she says, "clear as a cock-crow, exclaimed in my mind, 'if father hadn't died I'd have nothing of all this.' My hands clenched damp in my lap at this monstrosity. But I kept my wits and managed to face it. 'If father hadn't died,' I answered myself, 'you don't know what would have happened. And if you think that because I am happy now, anything could make me not wish him back, it's a lie.' But I remained a little less comfortable in mind."

When such a wish as this is not faced, but thrust with horror from the mind, it may be "repressed," and cannot in an ordinary way enter consciousness. It remains in some form in the unconscious, and thence may affect consciousness in various ways, determining for instance the course of a dream, or producing a hysterical symptom, for example, mutism, lameness, an irresistible tendency to make some apparently meaningless movement, &c. That the repressed "wish" should find any expression in consciousness is not of course necessary. Such expression indicates a failure more or less serious on the part of the repressing forces. It is when repression takes place after conflict that pathological consequences are most apt to arise. There is a normal course of repression which takes place in the natural course of growth, to which perhaps St Paul refers when he says that when he became a man he left childish things behind him. To the repressing forces Freud gave the name of the "Censor,"[1] a term which has given rise to a good deal of misunderstanding. As we see from the paragraph quoted above, the Censor is simply equivalent to the "ethical, æsthetic, and personal pretensions of the patient's personality."

We have already seen that consciousness has "depth" as well as "extent," and that in normal mental life *unconscious* processes are common. The unconscious mind has become an expression in ordinary use, but the phrase has proved to carry with it very misleading implications. It has been interpreted as if the meaning were that there are two minds, one conscious, the other unconscious, and quite distinct one from the other. No psychologist could of course for a moment hold such a view, and it would seem that even a little consideration

[1] The Censor is perhaps equivalent to McDougall's self-regarding sentiment, or to our "higher self" or "ideal self."

of the common phenomena of memory would show its absurdity to even the dilettante in the subject. A recent exposition of his own view given by Freud is this: "Man's archaic heritage forms the nucleus of the unconscious mind; and whatever part of that heritage has to be left behind in the advance to later phases of development because it is useless, or incompatible with what is new and harmful to it, falls a victim to the process of repression."[1] It is this normal repression that to a great extent accounts for the extraordinarily complete disappearance from the reach of memory of the experiences of infancy. In civilised societies repression has in the case of most individuals been carried out more successfully on the ego impulses (self-preservative tendencies) than on the sex impulses; this is the reason why so many of the mental breakdowns and troubles of the present day are connected with questions of sex.

Freud seems to us to agree with the position of James and McDougall—the position which we ourselves also take up—that man's life is based on instinct. But he insufficiently recognises the place of altruism in the life of the child; he regards the unconscious mind as predominantly egocentric, as absolutely regardless of the rights and interests of others. "The unconscious mind is the part of the mind that stands nearest to the crude instincts as they are inborn in us, and before they have been subjected to the refining influences of education. It is commonly not realised how extensive is the work performed by these influences, nor how violent is the internal conflict they provoke before they finally achieve their aim. Without them the individual would probably remain a selfish, impulsive, aggressive, dirty, immodest, cruel, egocentric and conceited animal, inconsiderate of

[1] *Int. J. Psy. Anal.*, vol. i. p. 395.

the needs of others, and unmindful of the complicated social and ethical standards that go to make a civilised society."[1] Passages like this are common in the works of the psycho-analysts, and in our view show an extraordinary ignorance of the psychology of babyhood.

If the innate impulses were wholly repressed man's life would of course be at a standstill. According to Freud a happier fate overtakes some part of them in that they are "sublimated." This means that their aim ceases to be purely personal, and becomes social. Moral ideals are accepted, and the instincts harnessed to their cars. The fighting instinct, for example, instead of being used to promote the purely selfish ends of the individual, may be enlisted in the service of freedom and justice.

To penetrate the unconscious life of his patients, and drag thence the "memories" that were troubling them, Freud used three methods. The first is the method of "free association" employed by Breuer in conjunction with hypnotism, a practice which Freud later found to be unnecessary; the second is the interpretation of errors; and the third is the interpretation of dreams.

The first method consists in the patient putting himself in a condition of reverie, starting from his trouble and saying out to the physician whatever "comes into his head." There must be no self-criticism, no holding back. Jung's method of word-association, in which the patient is required to respond to a word stimulus by means of the very first word called up by it in his mind, is a modification of the "free association" method.

The importance of errors as indicators of the content of the unconscious rests on Freud's deterministic theory, that our "accidental" acts are not really, as we imagine,

[1] Ernest Jones, *The Significance of the Unconscious in Psychopathology* (a paper read before the Section of Neurology and Psychological Medicine, Brit. Med. Ass., July 1914).

the result of chance, but are determined by unconscious mental factors. For example, the accidental forgetting one's bag at a friend's house may be the result of an unconscious wish to return soon; the accidental omission to wind one's watch may mean that one cares little about the morrow; the accidental losing of a key may indicate a desire to keep a box shut even against oneself. "An elderly colleague, who does not like to lose at cards, had to pay one evening a large sum of money in consequence of his losses; he did this without complaint, but with a peculiar constrained temper. After his departure it was discovered that he had left at this place practically everything he had with him: spectacles, cigar-case, and handkerchief. That would be readily translated into words, 'You robbers, you have nicely plundered me!'" The student should consider his own accidental acts and mistakes in the light of this theory. I may confess that although I am a person who seldom leaves behind anything deposited for a moment, yet I have three times laid down packets of examination papers on counters and walked off without them. On my subsequent return to retrieve my "error," I have not felt myself able to deny that there may be considerable truth in Freud's theory.

Dreams, says Freud, are the royal road to the unconscious. Some of his interpretations of dreams are very long and complex. Space forbids us here to discuss the method and theory of dream interpretation, but a brief example will give the student food for thought. "A woman dreamed that she had wrung the neck of a little barking white dog. She was very much amazed that she, 'who could not hurt a fly,' could dream such a cruel dream: she did not remember having one like it before. She admitted that she was very fond of cooking, and that many times with her own hands she had

killed chickens and doves. Then it occurred to her that she had wrung the neck of the little dog in her dream in exactly the same way that she was accustomed to do with the doves, in order to cause the birds less pain. The thoughts and associations which followed had to do with pictures and stories of executions, and especially with the thought that the executioner, when he has fastened the cord about the neck of the criminal, arranged it so as to give the neck a twist, so as to hasten death. Asked against whom she felt strong enmity at the present time, she named a sister-in-law, and related at length her bad qualities and the malicious deeds with which she had disturbed the family harmony, before so beautiful, after insinuating herself 'like a tame dove' into the favour of her later husband. Not long before there had taken place between her and the patient a very violent scene, which ended by the patient showing the other woman the door with the words: 'Get out. I cannot endure a biting dog in my house.' Now it was clear whom the little white dog represented. The sister-in-law is also a small person with an extraordinarily white complexion." The reader will note that even in sleep the "censor" is active, in so far as the repudiated thoughts are not admitted even to the dream consciousness except in disguised form.[1] Also it is worth noting that the dream analysis is carried out by the method of free association.

It is perhaps too soon to estimate the contribution that Freud has made to general psychology. His theories as we have presented them here fit in very well with the general position taken up in this book, but as we have indicated there is much in his teaching which certainly cannot be accepted. The importance he

[1] The example is taken from Ferenczi, *American Jour. Psy.*, 1912.

assigns to the emotional life of the child, and the stress he lays on the early years of infancy, are having a profound and in our view a beneficial effect on psychological doctrine in general.

§ 6. *Emotion and its expression.*—Charles Darwin, in his book on *The Expression of the Emotions*, assumed the view of common-sense, that the emotional state causes the expression. The facts are, however, more complex than is recognised by common-sense, which is before all things practical rather than scientific. Thus, it is well known that by *voluntarily assuming* the muscular movements which form part of the "expression" of an emotion, we put ourselves into a state highly favourable to the occurrence of the emotion, if we do not thereby actually arouse it to some extent; and, on the other hand, we at least partly suppress the emotion by suppressing those factors in its "expression" which are under voluntary control. This is evidently true in the case of the so-called "coarser" emotions (§ 3 above)—anger, fear, disgust, &c. And with regard to the internal sensations which form the remaining part of the "expression," it is well known that changes in organic feeling, produced by illness or disease, have a great effect on the emotional life.[1] It would seem then that the "expression" is *part of the cause* of the emotion.

Recent discussion of the relation of emotion to its expression has largely turned on the opinion advocated by Professor James: "Common-sense says, we lose our fortune, are sorry and weep; we meet a bear, are frightened and run; we are insulted by a rival, are angry and strike. The hypothesis here to be defended says that this order of sequence is incorrect, that the

[1] See concluding paragraph of this section.

one mental state is not immediately induced by the other, that the bodily manifestations must first be interposed between, and that the more rational statement is that we feel sorry because we cry, angry because we strike, afraid because we tremble; and not that we cry, strike, or tremble because we are sorry, angry, or fearful, as the case may be." [1]

Stated less paradoxically and more accurately, this means that the emotion is the *mental symptom of* the bodily changes which constitute the so-called expression; the movements and internal processes take place, and are "reported to the brain," giving rise to the emotion in its feeling-aspect. If this were true, it would mean that an emotion is nothing but a perception (or idea) *plus* sundry muscular or organic sensations.

We have already emphasised the view that from the level of special sensation upwards, feeling is never *merely* organic sensation, though it is always qualified by organic sensations. This applies to emotion in the same way. It is certainly true that the organic sensations are a real factor in the emotion; but even granting that they are a very essential factor, it does not follow that they are the only essential factor or that they are the whole of the feeling. They form part of the total experience which gives the emotion a quality of its own; [2] but they are not the only factor which does so. Each of the factors (*a*), (*b*), (*c*), (*d*) does so (see § 3, above); the emotion being a *single whole*, of which these are various features or elements.

The only approach to direct evidence that James offers

[1] James, *Principles of Psychology*, vol. ii. pp. 449, 450.

[2] "There are infinite shades and tones in the various emotional excitements which are as distinct as sensations of colour are" (James, *Psychological Review*, vol. i., No. 5, p. 525); cf. § 1, above.

in support of his view is a kind of introspective experiment: "If we fancy some strong emotion, and then try to abstract from our consciousness of it all the feelings of its bodily symptoms, we find we have nothing left behind . . . out of which the emotion can be constituted, and that a cold and neutral state of intellectual perception is all that remains. . . . What kind of an emotion of *fear* would be left if the feeling neither of quickened heart-beats nor of shallow breathing, neither of trembling lips nor of weakened limbs, neither of goose-flesh nor of visceral stirrings, were present, it is quite impossible for me to think. Can one fancy the state of *rage* and picture no ebullition in the chest, no flushing of the face, no dilatation of the nostrils, no clenching of the teeth, no impulse to vigorous action, but in their stead calm breathing, limp muscles, and a placid face?"[1]

We must again insist that, even if we cannot imagine the emotion *apart from* the feelings of its bodily symptoms, it does not follow that the latter are the whole of the emotion. On the contrary, we may reply that it is in the highest degree improbable that they are the whole of it, for a reason that appears when we ask: "What place (on James' theory) is given to the *perception or imagination of the situation*, which is the real ground of the whole emotional state?" The emotion arises because this situation is one where some interest of the individual is vitally affected. The recognition of this is a *mental disturbance*, a disturbance of ideas and conative tendencies, which are not organic sensations; this mental disturbance arouses feelings of itself. And this mental disturbance is the starting-point of the emotion. You see your friend in danger; and your

[1] *Text-book of Psychology*, p. 279.

recognition of the situation and its possibilities is an instance of the kind of mental disturbance of which we speak. It calls into play ideas and active tendencies which are connected with a diffused bodily disturbance, and the latter in its turn reacts on the mental state, adding a complication of organic sensations to the total state of consciousness called the emotion. Hence the "expression" is the cause of one feature of the emotion, not the whole of it.

In the so-called "finer" emotions, where the effect on the internal organs is comparatively weak, Professor James can only apply his theory by refusing to call them emotions, and treating them as purely intellectual states. And when this is evidently not the case, when there is evidently a real affective quality, he speaks of "the thinness and paleness of these feelings when unmixed with bodily effects," observing that "in all sentimental and impressionable people" the bodily effects mix in: the voice breaks and the eyes moisten when the moral truth is felt, &c.; whenever there is anything like *rapture*, however intellectual its ground, we find these secondary processes ensue.[1] In the same strain M. Ribot—an enthusiastic advocate of James' theory—gives examples of the strong bodily reaction involved in religious, intellectual, and similar emotions when in their most violent form, and then contents himself with saying *ex cathedra* that in the absence of such bodily reactions there is no emotion or feeling! We must insist that this way of testing the "strength" of an emotion is illusory. No doubt to introspection the intensity of a feeling seems to vary with the amount of organic and muscular excitement connected with it. But its real strength is

[1] James, *Text-book of Psychology*, p. 284.

to be tested by its capacity to influence and mould rational conduct (not by any ebullitions of pleasure and pain, nor by any "bodily reverberations" of organic feeling or muscular excitement). From this point of view an emotional disposition or sentiment, which in its entirety cannot be "felt" at all, is stronger than the transient emotions which engendered it, because it has a deeper and more penetrating influence on rational life (cf. § 4, above).

It is not for a moment to be denied that bodily states may be directly productive, not of an emotion, but of an emotional "mood" which is ready to fasten on anything, real or imaginary, and make it an object for the corresponding feeling. The "mood" is not an emotional *disposition*, for it is a fact of consciousness all the time. A painfully familiar and typical example is the "irritability" or "bad temper" which is due to bodily causes. We have already remarked that the central nervous system and the various vital processes of the body are connected in two ways: by nerves which are stimulated by these organic changes, and also more directly,—in particular, by the character and amount of the blood-supply. Hence, for example, an attack of dyspepsia or a bad night may produce an unhealthy condition of the nervous system which is felt as a state of irritability; or the use of drugs or stimulants may produce an unhealthy state of hilarity. Such "moods" are *slight* forms of morbid emotions which may assume very serious proportions in mental disease; their practical mischief lies in this, that they always tend to make the person look for or invent objects and occasions on which the emotion may fasten itself. They may be "groundless" but never "objectless." Ribot makes the mistake of speaking as if these were actual

emotions occurring without any perception or ideation. They are emotional moods, and they insist on finding objects.

Professor James' theory of emotion is stated and defended in *Principles of Psychology*, vol. ii., ch. xxv., and (more briefly) in *Text-book of Psychology*, ch. xxiv. It is enthusiastically advocated by Ribot, *Psychology of the Emotions*, pt. i., ch. vii. Subsequently, James modified his original statements: see *Psych. Review*, vol. i. p. 516, and short papers by Marshall, Stratton, and Irons, *Psych. Review*, vol. ii., pp. 57, 173, 279. Criticism of the theory has moved mainly on the lines indicated in the foregoing section; see, for example, Sully, *Human Mind*, vol. ii., ch. xiv., §§ 10, 10*a*; Ward, suppl. art. "Psychology," *Ency. Brit.*, vol. xxxii. p. 65, and in *Psychological Principles*, ch. xi.; Stout, *Manual*, 3rd ed., bk. iii., ch. v., § 3. McDougall, *Outline of Psychology*, 2nd ed., pp. 327, 328, appears to accept the theory in a modified form, substituting *instinctive impulse* for *organic or internal sensation*: so that the emotion becomes the "indicator" of the instinctive tendency aroused in us by a given situation.

A noteworthy criticism of the theory that "the psychical process of emotion is *secondary* to a discharge of nervous impulses into the vascular and visceral organs of the body" (James' theory) will be found in Sir C. Sherrington, *Integrative Action of the Nervous System*, 1906, pp. 255-268. He found that a dog, *devoid* of sensations from the viscera and all the skin and muscles behind the shoulder, exhibited most of the symptoms of emotion. He argues that the visceral expression of the emotion is *secondary* to the *cerebral* action involved with the psychical state, and that the connection of emotion with visceral changes arises indirectly through its impulsive power in relation to muscular activity, which in turn involves the less noticeable co-operation of the viscera, especially the circulatory and respiratory organs. "Visceral and organic sensations," therefore, "are contributory to primitive emotions, but they re-inforce rather than initiate the psychosis" (*op. cit.*, p. 267).

§ 7. *Development of emotion.*—The problem of the

evolution or development of the emotional life is at bottom part of the general problem of mental evolution in the history of animal and human life. It is not open to doubt that there has been such a development: that in the beginning all forms of life were alike, and were the simplest and least organised forms; that they gradually diverged and grew more and more different from one another and more and more complex in themselves, until they attained the almost infinite variety that we now find; that, implicated in this process, there has been a like gradual development and increasing complexity of mental life; that the human race takes its place in this process, and, in virtue of mental development, now represents its most advanced stage. This is an abstract statement of what happened, and it says nothing as to the causes or operative factors which brought about the process. Darwin's great contribution to the question was to prove the importance of "natural selection" as *one* of these factors. As soon as we begin to press the question of the origin of emotion and expressive movements, we are driven back to the question of the factors of biological and psychological evolution. It is not consistent with the plan of this book to raise these questions.[1]

We can, however, raise a question more limited in its bearings: What are we to understand by the evolution of feeling within the limits of the individual life (from early infancy onwards)? The general answer to this question has already been given (refer to ch. ii., § 3). In studying the "development" of the individual mind, we are studying the characteristics of the facts of mind in their natural chronological order, as gradually more

[1] See *Evolution in the Light of Modern Knowledge*, by various authors, London, 1925, esp. ch. ix., "Mental Evolution" (W. McDougall), and ch. xii., "Philosophy" (A. E. Taylor).

complex forms appear. In its application to feeling, this means that we can aim only at analysing each higher form of feeling as it emerges, and observing the order in which these forms emerge. This *time-order* is really the only principle of connection between "higher" and "lower" forms of feeling which is known; and this is the only meaning to be attached to such statements as that of Höffding: "It is possible that the 'tone' of the sensation, or the way in which it immediately affects our frame of mind, may psychologically be a germ, out of which the higher feelings are developed."[1]

Writers who attempt to "explain" the evolution of feelings in the individual life, usually conceive the problem thus: *Given* certain primary or fundamental emotions, it is required to derive all other forms from these by certain principles. These principles may be reduced to two: (*a*) "the law of transference," (*b*) "the law of combination, coalescence, or fusion."

(*a*) The "law of transference" is a real fact in the emotional life. Great stress was laid on it by the English School of Psychologists (especially Hartley, Bain, and Mill): but its range has been greatly exaggerated. It refers to the transfer of feelings to things that did not originally excite them. The feeling originally excited by an object spreads over to other objects *associated with* this one; and soon these other objects suffice of themselves to arouse the feeling, without a thought of the original one. The association may rest simply on the fact that we have experienced them, or been interested in them, together;[2] or it may rest on resemblance. An important special case of the former type is the transference of the interest from an *end* to the *means*. The case of avarice is a trite illustration. In

[1] *Outlines*, p. 222.
[2] Cf. Bain, *Mental and Moral Science*, pp. 104, 106.

its extreme form, the miser is said to feel for the money, and for the money alone, the desire that should belong to the pleasures, power, and influence that the money could procure. In the special case of *resemblance* the emotion may act unconsciously. Lehmann has shown the effect of this in the so-called "instinctive" likes and dislikes which are a common experience.[1] There is, in many such cases, a resemblance to some other person whom we have liked or disliked for ordinary reasons: this experience, though forgotten, has left traces in the mind which tinge with pleasant or unpleasant feeling the new and similar experience. A mother may feel a special sympathy for a youth who is like her lost son, and yet be unaware of the reason. "Instinctive" fears and aversions have often a like origin.

This influence of subconscious or unconscious resemblance in the development of feeling is of real importance, for by means of it feeling may spread very widely. The expansion of feeling by this means is illustrated on a great scale in the history of the race, in the widening of *fellow-feeling* or *sympathy*, until it includes not merely the clan or patriarchal group, but the tribe, the nation, the race.

(*b*) The so-called "combination," "coalescence," or "fusion" of feelings is a principle so vaguely conceived by those who appeal to it that its value is very slight. In a sense, "combination" is coincident with the whole course of mental development; for just as mental states may acquire a relative independence and self-subsistence, so they may lose it and combine into a larger whole. But what exactly takes place in this "combination"? Bain says that it "originates new states which acquire a permanent and generic form, wherein the simple elements

[1] *Hauptgesetze*, pp. 244, 245.

cease to be apparent." If so, the new state is not a combination of the simpler states; it is related to the simpler states only in that their appearance must have preceded its appearance. The simpler states are not the complex one, and the complex one is not the simpler ones, but something new and something different. All that is meant by such phrases as those quoted from Bain is that there is an ascertainable order of appearance in the processes, the simpler before the complex.

A further point of importance in the application of what we have said above to emotion is this: when particular feelings combine to give rise to a new feeling, the new feeling is not only qualitatively distinct from its "constituents," but the latter may continue to exist alongside the former as distinguishable states. The most careful students of the subject in recent years have not only recognised but emphasised the facts set forth in the foregoing paragraph. Professor McDougall, for example, speaks of "certain complex emotional reactions as blended emotions, or as emotional compounds formed by the blending of two or more of the primary qualities of emotion" (*Outline*, 2nd ed., pp. 330, 331); but he explains that the resulting "compound" is *a new reaction* of the mind on the coming together of the "constituents." With this understanding, he treats of "scorn" as a compound of "anger and disgust"; "loathing" (or "horror"), of "fear and disgust"; "admiration," of "wonder and negative self-feeling or submission"; "awe" of "wonder, submission, and fear"; and so forth (*Social Psychology*, ch. v.). In addition to the "primary" and "blended primary" emotions, he finds a class of feelings where the formula relating emotion and instinct does not apply; "an emotion of this class is not constantly correlated with any one impulse or tendency." These, as dependent upon sentiments, he calls "derived emotions": such are, sorrow, joy, hope, anxiety, despair. We believe that McDougall's treatment of the emotions (as distinct from his treatment of the instincts) is biassed and weakened by the assumption that an emotion is essentially the "indicator" of an instinctive impulse.

Wundt's position in the history of psychology during

the past fifty years lends special interest to the following statement (which implies a view of mental development essentially similar to the one which we have defended above). The passage is in his *Human and Animal Psychology* (Eng. tr.), pp. 219-221: "Every feeling is a qualitatively simple and undecomposable mental state. This fact does not, of course, exclude the fact of there being in consciousness several simultaneous feelings; only, these simultaneous feelings always combine in a *total feeling* which possesses a unitary character, and cannot therefore be regarded simply as the sum of the original particular feelings. . . . [When] opposing feelings alternate with each other in rapid succession, there is a continuous modification of one affective phase by the other, so that a new feeling with a characteristic quality of its own arises alongside of the primary changing feelings. Its quality is, of course, dependent upon those of the original feelings; but it cannot be analysed into them. . . . We have an example of this from the sense feelings in tickling, and from the intellectual feelings in doubt [mental dissension]; while the dissonance of two clangs may be taken to exemplify it in the field of the elementary æsthetic feelings. . . . [Again, in the common vital feeling (ch. vi., § 2) or *coenæsthesis*], the entire sum of separate organic feelings combines to form a complex unity, the trend of which finds its expression in a resultant total feeling. Similar total feelings with accompanying particular feelings constitute the higher intellectual, æsthetic, and moral feelings. In all these cases every particular feeling and every total feeling has its own characteristic quality, in virtue of which they stand in relations of agreement and disagreement to other feelings, though they are never analysable into them. So that nothing can be more erroneous than the opinion sometimes held that the entire world of feeling is composed of a certain sum of elementary feelings—perhaps sense-feelings—of approximately constant quality. The essential characteristic of feeling, especially of the higher feelings, is rather an inexhaustible wealth of qualities; new qualities arise from the mutual influences of simultaneous feelings and from the induction of present by antecedent feelings." The reader will observe that in this passage the term "feeling" includes "emotion."

Even when we endeavour to arrange the typical emotions in their "natural history" order of appearance, our results are very general in character; no precision of detail can be arrived at. We can distinguish three stages:—[1]

(1) First, certain emotions which have acquired distinctive names in ordinary life; which civilised man has in common with the savage and many of the animals nearest to him in the zoological scale; and which have characteristic bodily expressions which occur whenever the emotion occurs (*e.g.*, the *trembling* of fear). Examples of this stage are found in most of the so-called "coarser" emotions referred to above (§ 3). Their characteristic manifestations may appear very early in human life. They involve perception (of some situation which arouses the emotion), and themselves are modified according to the development of the capacity of perception, and the mingling of ideational elements with perception; so that any one of these emotions may occur at different levels of mental development.

(2) The next stage is represented by the emotions arising from an imaginative reinstatement of the original causes of the feeling; in other words, they are the manifestation of emotional dispositions and sentiments. All the emotions included in the first group can reappear at this higher level (modified accordingly); but the most important feeling of this type is Sympathy. Sympathy is usually explained as "the imaginative entering into others' feelings through recalling our own similar experiences" (Sully), or in words to that effect.

[1] The arrangement here given is in part the same as that given by Mr Sully, *The Human Mind*, vol. ii., ch. xiv., § 26. We do not, however, include "the general feeling of happiness and misery" under the head of Emotion.

Owing to the development of Sympathy the emotions may be extended, may arise not only through what happens to self but what happens to others: through the operation of Sympathy we feel anger, joy, fear, &c., *for another.*

(3) At a level of mental life which *presupposes* the development of Sympathy and of the emotions included under the two previous groups, we have the sentiments and emotions which attach themselves to the great common aims and ideals distinctive of human nature —Truth, Beauty, Goodness.

Several attempts have been made to give a general classification of the emotions on scientific principles. The student who desires to examine the results should consult Bain, *The Emotions and the Will*, ch. iii., and "Appendix B"; Mercier in *Mind*, old series, vols. ix. and x.: No. 35, July 1884; No. 37, October 1884; No. 38, January 1885; and Sully, *The Human Mind*, vol. ii., ch. xiv., §§ 25, 26 and "Appendix J."

In the remainder of this chapter we shall select some typical emotions, and point out their most important characteristics.[1]

§ 8. *Anger.*—The emotion of Anger is characterised by a tendency to *break down opposition*, whether the opposition consists in the direct infliction of pain or injury, or in hindrances being put in our way or difficulties made,—real or imaginary. The characteristic attitude of Anger is *active resistance and aggression*, while that of Fear is flight or helplessness. This

[1] Cp. § 1, above, and the analysis of Fear given there.

emotion, like Fear, can be manifested at every stage of mental devélopment, modified by the growth of the fundamental functions of mind. When the cognitive processes are in an elementary state, the emotion appears as an impulse to break and tear, rend and destroy, *anything* that comes to hand. This has been noticed among gregarious animals—*e.g.*, if a herd of cattle are enraged by the sight of a companion in distress, they are as likely as not to vent their rage on the unfortunate victim himself, if nothing else catches their attention. In the same way, when one of a group of dogs utters a howl or cry for no apparent cause, the others, angry at his distress, have been known to turn and attack each other when there is nothing else to attack.

At higher stages of mental life, the opposition which is the real object of the emotion may take more complicated forms; and the development of ideation enables the characteristic activities of Anger to be concentrated on its actual existing cause. Professor G. F. Stout has excellently stated the various forms of this emotion in their relation to mental development:[1] "Anger initially expresses and satisfies itself by a peculiar form of violent motor discharge. Even at the outset it takes the form of an effort to overcome resistance by main force. The young child who has acquired no definite mode of wreaking its passion, shows it by vague kicking and struggling, by movements which antagonise each other and encounter resistance in external objects. The development of cognitive consciousness serves simply to restrict this diffused mobility within more definite channels. The child in a later stage throws his play-

[1] *Analytic Psychology*, bk. ii., ch. vii., § 2 (vol. ii. p. 96).

thing violently to the ground, or pushes it away, or breaks it, or, in the case of a person who thwarts his will, he kicks, pushes, or strikes. Even the adult may find some satisfaction for his irritation in destroying furniture, and he nearly always has a strong disposition to break, tear, or rend something. Inasmuch as his anger has become enlightened and defined, his destructive impulse will become more specially directed against the object by which his desires are crossed or thwarted. But when the conditions deny him this satisfaction, it is well known that the angry man is very apt to wreak his anger on inoffensive things or persons, thus approximating to the condition of the child. Though the tendency to overcome resistance by violent exertion of bodily force seems always to play some part in anger, yet with the advance of intellectual development it gives place more and more to an ideal satisfaction; it becomes enough to know, or sometimes even to imagine, that the opposing forces have been crushed by our agency. This is, of course, a direct consequence of the growing importance of the life of ideas as compared with that of perception. But even in the ideal satisfaction of anger, the impulse to destroy or break down opposition may be satisfied to some extent by wreaking it on other objects than those which immediately awaken resentment."

In addition to the aggressive movements in the expression of Anger, the muscles of the eyebrows and jaws are set in a way which seems an "organic reminiscence" of the utility (in past ages) of clear vision with protection of the eyes, and of biting. In affective quality it is a massive excitement, to many people pain-

ful. Its general organic symptoms are the opposite of those of Fear; in particular it is accompanied by vasomotor flushing and excitement of the circulation.

When the emotional impulse of Anger, aroused by the infliction of some ill, is (so to speak) deliberately taken in hand by the agent, and made into a calculating determination to return ill for ill, we have *Revenge.* In animals it is indistinguishable from the immediate impulse of Anger. In primitive societies it becomes the rule and custom of "an eye for an eye, a tooth for a tooth, a life for a life."

The *emotional disposition* resulting from Anger is *Hate.* Its feeling-tone and bodily symptoms are the same as those of Anger. Anger seems to lead to Hate when the aggressive movements, expressive of Anger, are more or less permanently restrained. Hate is not simply the cherishing of Anger; or rather, the Anger is only cherished because not satisfied.

Bain's account of Anger (*Mental and Moral Science*, pp. 261-263) seems defective in more than one respect. "Anger contains an impulse knowingly to inflict suffering upon another sentient being, and a positive gratification in the fact of suffering inflicted" (p. 261). This involves the development of distinct ideas; it is too narrow as not covering primitive forms of the emotion, where no such distinct ideas are possible; and it does not cover the higher forms of what Bain admits to exist—*i.e.*, "righteous indignation," when anger mingles with the moral feelings (p. 266). Moreover, there is little doubt that it is altogether a mistake to make a "positive *pleasure of malevolence*" an essential part of Anger. The "pleasure of malevolence" is the delight in inflicting pain and injury on another being simply because it is pain and injury, and for no other reason whatever,—"disinterested malevolence." Granting that such an impulse exists (see discussion between Bain and Bradley,

Mind (O.S.), vol. viii. pp. 415, 562), it is quite possible that Anger is at times complicated with it; but the two impulses are characteristically distinct. It is a matter of common experience that Anger may be vented on inanimate objects, known to be inanimate.

§ 10. *Love.*—The emotion known in common language as *love* is a sentiment—in the technical sense of the word—which manifests itself in particular emotions and actions. As the term is usually understood, it includes sympathy; love and sympathy are regarded, not as the same, but as so united that without "sympathy" most of the characteristic developments of "love" could never arise. Love unaided by sympathy is described as "selfish love"; and its essential mark is to seek to satisfy itself, *regardless of the welfare of the loved object.* When the feeling is excited, not merely by the presence of the loved object (another sentient being), but also by considerations for the welfare of the object, we have the emotion or sentiment of love.

If we try to separate the two ingredients and consider them apart, we may perhaps distinguish them as Mr Sully has done: "In the first place, there is the liking for others growing out of the pleasure or satisfaction which the presence or companionship of others brings, or the bare *feeling of attachment*, an emotion that has in its more concentrated forms the characteristic reaction of fondness or caressing. In the second place, there is the feeling of sympathy, or the sharing or entering into the feelings of others The former ingredient has an egoistic basis. . . . The second ingredient is the pure altruistic element in the feeling."[1]

[1] Sully, *The Human Mind*, vol. ii., ch. xv., § 12.

What is here called the "feeling of attachment" is also called by Bain the "tender emotion."

The importance of Mr A. F. Shand's work requires us to observe that his terminology differs from that which we employ in this book. The difference, however, appears to be scarcely more than in usage of terms. With Ribot (*Psych. of Em.*, pt. ii., ch. iv.) he uses the term "tender emotion"—which we do not use at all—to stand apparently for the purely altruistic element in sympathy: he regards "sympathy" as not necessarily altruistic, and as needing the aid of the "tender emotion" to become so; see his *Foundations of Character*, bk. i., ch. iv., § 3, and the general argument of chapters iv. and v. For a briefer statement, see Shand in Stout's *Groundwork of Psychology*, ch. xvi.

The account given in this book does not differ materially from that given by Sully (vol. ii., ch. xv., §§ 11-14, 15-23), and Bain, chapters on "The Tender Emotions" and "Sympathy and Imitation" in *The Emotions and the Will* and in *Mental and Moral Science*, except that the account given by Bain seems to need to be supplemented in one important respect (he does not appear to recognise the importance of the fact that we can sympathise beyond the limits of our own experience), and that the same writer greatly exaggerates one element in the bodily expression of the feeling of attachment — namely, the delight in bodily contact (cf. James, *Principles*, vol. ii. p. 551). To the first of these two points we shall refer again below (§ 11).

At the level of animal life the feeling of attachment springs from certain primary feelings arising from physiological facts: the feeling of maternal satisfaction in tending offspring and the gratification of the sexual impulse. These are complicated by "transferred feelings" (§ 6) leading to a general satisfaction in the presence of the

sentient beings who have given pleasure. But until the life of ideas (memory and imagination) has attained to a considerable degree of development, the feeling can only exist in limited forms.

At the level of mental growth characteristic of human life the feeling may be described in general terms as an exclusive interest in a particular person—an interest of such a kind that no other than the particular person loved can satisfy it; but the "exclusiveness" has degrees, and not all kinds of love are limited in reference to one individual. Bain appears to have regarded the whole physical expression of the feeling of attachment as consisting in bodily contact of some kind—touches, caresses, embraces, &c. There is little doubt that this is a great exaggeration. We can only say that the natural outlet of this feeling, in all its forms, is delight *in the society of, or in the presence of*, the individual who is its object. The same writer speaks quite truly of its connection with tranquillity and repose: "It is a tranquilliser under morbid excitement, a soothing power in pain, a means of enjoyment when the forces of the system are at the lowest ebb or in abeyance for the time."[1]

We may distinguish forms of the feeling of attachment, among human beings, according to certain relations among individuals; thus:—

(*a*) Attachment based on inherited dispositions through blood-relationship. These forms of the sentiment are sometimes called "the natural affections." Their strongest and most typical expression is in parental love. This is the least exclusively *human* form of attachment; as we have seen in other cases, there is in human affection a primitive groundwork modified

[1] *Mental and Moral Science*, p. 242.

and enriched by the self-conscious and rational nature of man. The conditions of parental love have been thus stated by Martineau: "That the beings on whom it is directed be, independently of us, the *image of our essence*, and, dependently upon us, the *continuation of our existence*." "Suppose either of these elements of the case absent; suppose the child to be human, but not ours; or to be ours indeed, but to turn out other than human; and the feeling in the one instance fades into general kindliness towards the young, and in the other shrinks away and passes into repugnance or terror."

(*b*) Love as independent of blood-relationship. This form of the sentiment is really *Friendship*, more or less exclusive, more or less intense. Friendship seems naturally to rest on a contrast, not of hostile qualities, but of *supplementary* ones; so that it is not a case of one liking what the other hates, but of an instinctive feeling that one supplies the deficiencies of the other.

(*c*) Love as between persons of opposite sexes,—"romantic love." Here the "exclusiveness" of the sentiment is most prominent. This, as it occurs in civilised society, is a highly complex emotional disposition. Part of its impulsive character arises from its connection with the mating instinct, and part of the pleasure involved in it is of the sensuous-æsthetic kind—through the senses of sight and touch; and Bain's remark that the tender emotion culminates in an embrace is less inapplicable.

§ 11. *Sympathy*.—Sympathy is an emotional disposition resting on the interpretation of other beings by ourselves. Seeing the signs of a certain experience in another, or merely thinking of him as having that experience, we tend to feel an emotion qualitatively the same as that which we believe him to have from the

experience. We are able to interpret the signs of another's feeling, if his emotion is one which we have felt ourselves, or even if it is one which we *have never ourselves felt*, provided it is one which we are humanly *capable of feeling*. This is of extreme importance, for otherwise our ability to appreciate the feelings of others would be strictly limited to the range of our own experience. Persons who are thus limited in their sympathies are regarded by common-sense as lacking in sympathy or "imagination," as "narrow-minded," or as "undeveloped characters." It is the reach of sympathy beyond this limit that makes it so great a factor in widening our knowledge of ourselves and our outlook on life. We alluded to this in speaking of Introspection (ch. i., § 4, pp. 12, 13); this was only one particular application of a general principle. The presence of others is a means of discovering the individual to himself, because *their* experiences are *actually or potentially his*, and he knows it. In the case of sympathy, we may avail ourselves of Bain's definition: to sympathise is "to enter into the feelings of another being, and to act out these for behoof of that other as if they were our own."[1] Anything short of this is an incomplete or undeveloped form of sympathy.

Bain's careful account of Sympathy (see chapters under this title in *Mental and Moral Science* and in *The Emotions and the Will*) is defective in not recognising the importance of the fact that we can sympathise beyond our experience. Mr Sully's excellent treatment (*Human Mind*, vol. ii., ch. xv., §§ 15-23) recognises this incidentally (§§ 18, 23). The problems in the psychology of sympathy are well summarised by Höffding, *Outlines*, pp. 244ff.

The immense practical importance of sympathy lies

[1] *The Emotions and the Will*, ch. vi.

in its characteristic prompting—*to act for another person exactly as for self.* This appears perhaps most clearly in the form of sympathy known as *compassion*—the feeling which springs forth at the sight of suffering, and which leads directly to efforts for the relief of the sufferer.

The process of sympathy affords an indication of the fact which we arrived at above through criticism of Professor James' theory,—that the bodily symptoms of an emotion contribute to the character of the emotion but do not initiate it. We do not, it is true, actually imitate or go through the manifestations of the emotion that we see in another; but so far as we apprehend them at all, we go through them in idea, and the mental representation of them is accompanied by nervous discharges which to a certain extent make us feel them. This helps or contributes to arouse the corresponding emotion in us. But this instinctive reaction is of course not the sympathetic feeling itself. The latter depends on the imaginative interpretation of the emotional signs which we perceive. If the feeling which is expressed is very familiar, as when a mother hears her child cry, the interpretation is instantaneous. It is less immediate, according as the feeling which is expressed is less familiar to our past experience. In the case of new untried experiences it may be a matter of difficulty; and though it is certain that we *can* sympathise beyond our experience, cases may arise which are altogether outside the range of our sympathies, as with the average Englishman and the Irish peasant of the south and west. Finally, in all complete sympathy there is the active impulse referred to in the preceding paragraph. Hence for complete sympathy there is needed a considerable development of the capacity for forming free ideas of

imagination, and of a common emotional life among the members of a community. The highly organised social life of a modern civilised country, with its closer and more systematic co-operation, affords ever new openings for effective sympathy, extending, unfortunately, far beyond the power of sympathy which the average man possesses.

We must be quite clear as to what is implied in this imaginative realisation of the emotion of another. It is by no means simply that one echoes (as it were) the organic sensations or pleasures or pains of the other. The emotion itself, which is to be sympathised with, is a concrete and total state of mind, including, as we know, not only affective qualities and internal sensations, but perceptions or ideas and active tendencies as well; it springs out of a definite intelligible situation; and it has effects on the individual's character and desires. All these things are realised, in some degree, in the imagination and feeling of the true sympathiser. Thus true sympathy may be called *disinterested* or *rational* sympathy.

Hitherto we have spoken of sympathy only in its highest forms; and we have incidentally referred to its "incomplete" and "undeveloped" forms. We now briefly indicate the nature of these. Their general character is to be more allied to *instinctive imitation of the emotional manifestations* witnessed in another being, than to *imaginative realisation of the emotion* which is expressed. Hence they have been called cases of the "contagion of feeling"—a phenomenon frequently illustrated in the animal world (especially among gregarious animals); among the lower races of mankind; and in children.

The animal that merely utters cries in response to the

similar cry of his fellow, takes on, at any rate, one factor in the emotional state which the other's cry expresses; but the imitative sympathy does not fully operate until the sounds or other signs, which the one creature perceives, actually suggest and arouse in him the other's feeling. This may occur without the animal having any *idea* or mental representation of his fellow-creature as a distinct being who feels in such a way.

Some of the facts, illustrating what we have just said, are familiar. For example, there is the contagion of *fear*, which has been so often noticed among gregarious animals, as in a flock of sheep;[1] also among children, and the lower races. A "panic" in a crowd, or in an army, occurs in the same way; for in a sense it is true that the crowd has a *mind of its own*, and this mind is at a lower stage of development than the minds of the individuals composing the crowd, and is extremely "suggestible."

The kind of sympathy of which we speak is illustrated, at the level of civilised human life, in such facts as feeling depressed at witnessing the signs of grief, pained at witnessing suffering, inclined to laugh at others' laughter. Such experiences are by no means necessarily altruistic. A man may feel this so-called sympathetic pain at the sight of suffering, and it may prompt him to go away and dismiss the scene from his mind, so as not to be troubled by it.

[1] The following is a curious case of the combination of such contagion with what looks like heredity: a flock of geese, having been kept and bred together for successive generations, "every evening for ten years manifested wild terror at a place and twilight hour coincident with a murderous attack that had once been made on them by dogs, although all the older members of the flock had been killed off every year for market."—(*Revue Scientifique*, 4th May 1889; quoted in Schofield's *Unconscious Mind*, p. 14.)

The higher form of sympathy—involving a distinct mental representation of our fellow-creature's feeling *as his*, and an impulse to act for his sake—can and does occur sporadically in the animal world (in maternal care for offspring) and in the lower races; but for the reasons already given, its fuller and more varied forms can only occur in civilised communities.

§ 12. *Sympathy and reverence as fundamental moral impulses.*—The higher development of sympathy prepares the way for yet another stage, in which sympathy may be regarded as a fundamental moral impulse.

The general aim of this sentiment may be thus described: it prompts us to act *so that another person shall be or attain to something which we regard as better than his present state.* This covers, in the first place, compassion (the relief of suffering); it covers the spread of instruction and enlightenment; it covers uplifting of *character*, and the removal of all influences tending to depress and hinder the development of human nature. The "something better" which is desired, is judged to be better because, finding it actually realised in ourselves or others, we compare it, as so realised, with the state of the person, or class of persons, to whom our desire has reference.

There is a *converse* form of this desire, based on the recognition of our own state as unworthy when compared with that of another personality,—*realised* in him, and *potentially* ours. "It is the objective image of the nature sleeping within us," says Martineau, "that wakes it up and startles it into self-knowledge. The living exhibition in another of higher affections than we have known, far from remaining unintelligible to us, is the grand means of spiritual culture. The natural language of every passion of which we are susceptible speaks to

us with a marvellous magic, and calls up fresh islands and provinces of consciousness where there was a blank before. And whoever is the first to give explicit manifestation to our own implicit tendency touches us with admiration and acquires a certain power over us." It is at this stage that Reverence comes into being—if it does at all. This is a sentiment attaching intimately to personality. It is, however, to be distinguished from Respect or Admiration; these are sentiments resting on the recognition of what is excellent, or even normally good in a person, understanding "good" and "excellent" in their widest sense. Reverence rests on the recognition of *moral superiority* in personal character. There are persons whose mental constitution is devoid even of the faintest beginnings of Reverence.

§ 13. *The moral sentiment.*—Sympathy—understood as the capacity to represent to oneself the inner life and feelings of others,—and Reverence—understood as the recognition of moral superiority realised in a personal life,—form the strictly ethical constituents of the complex fact called *Conscience.*

Conscience is intellectual, emotional, and impulsive in one. We are speaking of conscience as a psychological fact,—as what it is; not of what, from the point of view of ethical theory, it ought to be. In its intellectual aspect, it passes judgment as to whether a particular act is "right," or "ought to be done," in a particular situation. We have certain definite and wholly concrete facts,—the given capacity of the person at the given moment, and his given surroundings. Part of these surroundings consists of the concrete feelings and volitions of other persons in the given case. The moral act is that which meets the present actual situation; and what conscience judges of is the harmony (or

the reverse) between the agent's own will and these given circumstances in which other personal wills play the largest part. This harmony is expressed in the judgment "it is right." The *data* on which the moral judgment is based—so far as they are purely ethical data—are provided by *rational sympathy*, affording insight into the life and feelings of the other persons to be affected by this act, and *reverence*, affording a recognition of the moral superiority of the act when compared with other possible ways of meeting the same situation. These facts in the concrete experience are expressed in the judgment "it ought to be done," which implies an authoritative claim, which we call "moral obligation."

It is usually said that the most distinctive characteristic of the ethical feeling is its *sociality*. "Our duties *are* our social relations." This is directly involved in what we have set forth. The action, which is morally judged, has reference to others, as we have seen, and this reference to the real interests of others is the basis of the moral judgment. We may extend this thought farther by introducing the idea of a *community*—a society that has settled down into definite and more or less orderly forms of life; and we may then say that "what is 'right' has no meaning save with reference to a community that would benefit by the line of action." It may be an ideal community,—a "kingdom of heaven on earth"; but the moral sentiment is always expressed in the consciousness of our relation to a community. On the other hand, this is not to be regarded as an exhaustive statement of its meaning; "the consciousness of our relation to a community" is not, by itself, an adequate account of the two roots of the ethical sentiment—reverence and rational sympathy. *Rational Sympathy*

provides us with the idea of a *common* good, and *Reverence* leads us to value it as superior to merely private good.

The foregoing account implies that the emotions distinctive of *conscience* arise from the perception of certain objective (social and other) facts, and directly from this perception. It has been maintained, on the other hand, that conscience is primarily an emotional reaction on the tendencies of our subjective sentiments: see, for example, Shand's brief statement, *Foundations of Character*, pp. 119, 120 (cp. pp. 114, 115). An extreme form of this view was advocated by Martineau, *Types of Ethical Theory*, vol. ii., "Idio-psychological Ethics." The tendencies of our subjective emotions and sentiments (so far as these are not *blind*) become objects of rational apprehension and lead to the perception of the objective facts as maintained above.

Conscience, however, seldom or never judges on these purely ethical data *alone*. As a mental tendency or disposition, conscience is mingled inextricably with inherited and acquired experiences which we may call non-ethical (the use of this term implies only that in our view these other factors do not contribute the characteristically *moral* element in conscience). The other factors may be classed under three heads.

(*a*) Experience of the results of actions with respect to the agent's own pleasure and pain. By the "law of transference" (§ 6*a*) the mere idea of an action may acquire affective quality strong enough (according as the past results of the act have been pleasant or unpleasant) to be the basis of a habit of preference or avoidance.

(*b*) Experience of the force of public opinion or the collective opinion of party or class: this again leads, by transference of feeling, to the formation of habits of

preference or avoidance (aided by love of approbation and regard for others' opinion). In this way the *social* results of his actions, as beneficial or injurious to the community, are impressed on the agent.

(*c*) The same result ensues from what Bain calls "our education under Government or Authority," by which certain acts are from the beginning associated with disapprobation and punishment.[1]

It is implied in all this, of course, that the individual has some regard for his own happiness and welfare; otherwise these experiences could never have the results which they do have. Hence it seems unnecessary to mention "self-interest" or "prudence" as a factor specially contributing to the formation of conscience.

Hence what is ordinarily called conscience is a highly complex fact. The result of this complication is that these non-ethical data may *displace* the purely ethical data as grounds of judgment. But in the ordinary deliverances of conscience the two kinds of data are combined. Hence arise (*a*) the admitted variations in moral judgment in different communities or different times, and (*b*) a general agreement as to the moral value of certain general rules of action (as for instance in the ethical portion of the Decalogue). When a community has developed the capacity of disinterested sympathy, and of appreciating the results of actions on the common welfare, a system of customary rules of conduct (for the common welfare) begins to take shape. We must add that in this regard for the *common good* as more worthy, or as having higher claims than momentary or individual inclinations and passions, the action of the purely ethical sentiment of *reverence* is to be found.

[1] See Bain, *Mental and Moral Science*, part ii. (Theory of Ethics), ch. iii., §§ 9, 10, 11.

It is now generally admitted that no account of the development of conscience can be given which does not presuppose disinterested sympathy, under one name or another; see Sully, *Human Mind*, vol. ii., ch. xvi., §§ 17-23; Ribot, *Psychology of the Emotions*, pt. ii., ch. viii.; Höffding, *Outlines*, pp. 258-261. On the other hand, the sentiment of reverence, and its effects, are generally ignored in this connection. But as a matter of fact and experience, reverence is as characteristic a sentiment as sympathy, and there seems to be no reason for denying its operation in the development of morality. We may go farther, and say that this sentiment alone can account for the *moral valuation* even of the common good as superior to the personal and limited good. Höffding says: "When *sympathy* leads to such a *valuation*, it becomes an ethical feeling . . . [implying] the idea of a connected whole of conscious beings, each of whom has his own special centre of life, and each of whom consequently has a claim to a special form and direction of sympathy. The view being thus enlarged, the individual feels himself only a single member of a great kingdom evolved in the course of ages; and that to which the impulse of self-preservation and the impulse of momentary sympathy alike impel him is ultimately controlled by the impulse to work for the advancement of this kingdom. When this impulse comes into more or less strong opposition to the egoistic or the narrower sympathetic feeling, it is felt, if it still succeeds in taking effect, as a law which requires the individual and limited to be subordinated to the universal and comprehensive. The ethical feeling resulting from this is the *feeling of duty*" (pp. 259, 260). This admirably pointed statement brings out the contrast which makes the moral life possible; and this feeling for the higher claim of the universal and comprehensive is, we submit, an essential constituent of human nature. We have called it Reverence. Disinterested sympathy alone will not provide it. Writers who deal with the development of morality usually assume that it is explained by the operation of the factors which we described above as "non-ethical"; but we affirm with confidence that these, by themselves, could make us feel the common good as superior in *size*

or in *power*, not as superior in *moral worth*. This distinctively ethical characteristic is just what they will not explain.

There are certain instinctive emotions of the type of group (1) (see p. 251) which we have not referred to.

The emotions arising from apprehension of the true and the beautiful present characteristics which will be most conveniently discussed in connection with the subject of chapter x. below (the general conditions of feeling).

We add some general references for the topics dealt with in this chapter. Among older work on the subject, Bain's treatment in *The Emotions and the Will*, and Ribot's in *The Psychology of the Emotions* (Eng. tr.), are still valuable. The same may be said of Sully's rather later work in *The Human Mind*, vol. ii., ch. xv.; and some suggestive observations will be found in Höffding, *Outlines*, ch. vi., §§ 8, 9.

Recent study of the subject has largely turned on the work of Professor McDougall, *Social Psychology*, 14th or later ed., esp. ch. iii.-vi., and Supplementary Ch. iii. (summarised in the same writer's *Outline of Psychology*, ch. xi., xii., xvii.). We have no criticism to make on McDougall's definition of *Instinct* (see above, ch. vii., §§ 3 ff.); it is a definite conception, but it *excludes* several important "general or non-specific innate tendencies" (*Social Psychology*, ch. iv.); and when it is combined with the theory that Emotion is an "aspect" or an "indicator" of an instinctive impulse, it results in an inadequate and even narrow view of our emotional life. See Mr A. F. Shand's treatment in his *Foundations of Character*, especially bk. i., ch. iii., iv., v., and bk. ii. McDougall, in the Preface to his 14th ed., thus describes the chief differences between Mr Shand's doctrine and his own: "He regards the emotions as highly complex innate dispositions, within which the instincts are organised as merely so many sensory-motor dispositions to particular bodily movements.

A second important difference is that he regards the sentiments as innately organised systems of emotional dispositions: thus for him both love and hate are innate sentiments, and each of them consists of the dispositions of four emotions, joy, sorrow, anger, and fear, linked together to form one system. In my view the sentiments are acquired through individual experience."

Nevertheless it may be maintained that Shand's theory of the subject enables him to take a broader, richer, and deeper view.

CHAPTER IX.

THE SPECIAL SENSES.

We now enter on a survey of the more important facts in the psychology of Sensation (compare ch. iv. above, § 10, p. 101) regarded as a process by which we come into immediate contact with the material world present to us.

§ 1. *Sensation and Perception.*—The fundamental process in our apprehension of the material world present to us is called Perception; and Perception, in the simplest form in which we experience it, is called Sensation. These terms, says William James, "are names for different cognitive *functions*, not for different sorts of mental *fact*. The nearer the object cognized comes to being a simple quality like "hot," "cold," "red," "noise," "pain," apprehended irrelatively to other things, the more the state of the mind approaches pure sensation. The fuller of relations the object is, on the contrary, the more it is something classed, located, measured, compared, assigned to a function, &c.; the more unreservedly do we call the state of mind a perception, and the relatively smaller is the part in it which sensation plays."[1] Sensation, therefore, as we have observed, differs from perception only in the comparative simplicity of its content. But in both

[1] *Principles of Psychology*, vol. ii. p. 1.

sensation and perception there is what we call metaphorically an immediate "contact" or "encounter" with reality; while in *thought* in the stricter sense, in conception and reasoning, the objects thought about may not be present in this immediate physical way. "Both sensations and perceptions," says James again, "differ from 'thought' (in the narrower sense of the word), in the fact that nerve-currents coming in from the periphery are concerned in their production. In perception, these nerve-currents arouse voluminous association or reproductive processes in the cortex; but when sensation occurs alone, or with a minimum of perception, the accompanying reproductive processes are at a minimum too." Normally, therefore, a *sensation* is the mental experience resulting directly and immediately from the stimulation of an afferent nerve. In this chapter we shall consider the sensations of the special senses as far as possible by themselves, and in abstraction from other processes with which they are united in experience.

It must be distinctly understood that in this book we can dwell only on the facts to which it is indispensable that the student's attention should be directed in an elementary course of psychology. The psychology of sensation is really a special department of the subject, belonging to the field where physiology and psychology overlap. An adequate treatment of it would require a volume to itself, even if we dealt only with the facts ascertained beyond doubt and omitted controverted points.

The fact that the progress of neurological investigation may be highly illuminating for the psychology of sensation and perception, has been illustrated in recent years by a remarkable series of researches carried on by Dr Henry Head, Dr W. H. R. Rivers, and their collaborators; the papers, previously published, are now collected in *Studies in Neurology*, 2 vols., Oxford, 1920.

Sensations, as we have seen, arise normally when a sense-organ is stimulated so as to give rise to nervous impulses propagated to the brain, and only when these have reached some part of the cortex does any kind of sensation arise. We may ask *why* the brain must be affected in this way before we can have the mental experience called sensation; *why* a particular part of the brain must be affected by an incoming nervous impulse before a particular kind of sensation can occur; *why*, for instance, we experience a sensation of sight only when a stimulus of the optic nerve (normally beginning in the retina) is transmitted to a brain-area which can be definitely marked out[1]; but the answers to these questions lie wholly beyond our knowledge. No physiological analysis of the nature of nerve-action enables us to *predict* that a sensation would be aroused by an incoming stimulus.

The *limited range* of our senses is such as to raise questions which, if we followed them, would lead us far afield. But some fundamental facts may be mentioned here. The limitations of our senses may be illustrated in the case of sight. It has been possible to construct instruments sensitive enough to detect electro-magnetic waves, capable of pervading the material world around us at a uniform velocity of 300,000,000 metres (186,000 miles) per second, and with wave-lengths varying from about ·0000000003 of a centimetre at one extreme to 3,520,000 metres at the other. If we imagine this vast range divided into (say) sixty "octaves," then only one "octave" of wave-lengths (·00004 to ·00008 cm.) is capable of stimulating the retina and producing visual sensations, finally reducible to the series of colours in the "spectrum" from darkest

[1] See above, ch. iii., § 3, "localisation of brain-function."

violet, through indigo, blue, green, yellow, orange, to dull red.

The limited number of our senses, as avenues of contact with reality, is even more significant. We may suppose existence to have a thousand modes; but these thousand modes are all to us as nothing, unless we possess senses accommodated to their apprehension. With, at present, five or six avenues of knowledge we apprehend as it were only so many facets or aspects of existence. Reality may be pouring forth its splendours in countless, to us unknown, ways from which our perception is holden. We can conceive the number of the senses indefinitely increased—in which case each new sense would be to us the revelation of a hitherto unknown side of existence. But this possibility *in no way discredits our actual apprehension of the qualities of the real, so far as that apprehension goes.*

To pursue this consideration further would carry us beyond the field of psychology. It must suffice to note carefully that, as a matter of fact, whatever philosophical interpretation we give to it, our sensations are not only inseparably bound up with our total experience at the time, and not only modified by past experience through retentiveness and association; they seem always to put the mind in communication with what we call "real things." This is a fundamental part of their meaning (see ch. xi. below). "A sensation of red, for instance, means *something red*, or something which appears red; in apprehending any sensuous presentation we apprehend it as conditioned by something which is not itself an immediate experience [as the sensation is],—something capable of existing before and after the sensation itself."[1]

§ 2. *Essential aspects of sensation.* — In popular-

[1] Stout, *Manual of Psychology*, pp. 209, 210.

language, a "sense" is a group of sensations separated from other groups by a very broad dividing line,—as "sight" is from "hearing," or "taste" from these and from "smell," &c. Five such groups are commonly recognised; but we have already seen that it is necessary to be more precise.

We must first distinguish and set aside the class of sensations which arise from the interior of the organism, and have no peripheral sense-organ. These are, of course, the internal or organic sensations, whose characteristics we have discussed in ch. vi. They do not afford any means of information about outer objects, but only about the condition of the body itself, and that vaguely. To this class belong also those *muscular sensations* (especially muscular fatigue or injury) which form the basis of our acquaintance with the state of the muscle itself. The other groups are—

(1) Sensations of Taste proper. What is usually called "taste" is complicated with sensations of touch and smell.

(2) Sensations of Smell.

(3) Cutaneous sensations, so far as resulting from actual contact of the external stimulus with the skin, and thus distinguished from the internal organic sensations usually called by the same names. These cutaneous sensations are:—

(*a*) Pressure, or touch proper.

(*b*) Heat and (perhaps a distinct sensation-quality) warmth.

(*c*) Cold and (perhaps distinct) coolness.[1]

(*d*) Pain, so far as resulting from contact with the skin.

[1] The sensations, "hot" and "cold," are produced by what we call "opposite" kinds of stimulus; but there is no meaning in calling them "opposite" *kinds of sensation*. "Hot" and "cold" as sensations are just *different*, as "hot" and "heavy" are.

(4) Muscular and kinæsthetic sensations which are connected with the passage of nerve-currents from the skin, articular surfaces, ligaments, and muscles themselves, during muscular contraction. They also afford important data for our knowledge of external things; in this aspect they will come under our notice in connection with space-perception.

(5) Sensations of Hearing.

(6) Sensations of Sight.

All these groups differ in *quality*. But besides these "generic" differences of quality we have also "specific" differences of quality within each group—*e.g.*, blue, red, green, in the case of colour. In addition to this, sensations differ in *intensity*—as in the contrast between a loud sound and a soft one; and in *duration*. These three aspects seem essential to sensation; for if any one of them vanishes or becomes "zero," the sensation vanishes. Thus, a sensation with *no intensity* is no sensation; and similarly with quality and duration.[1]

These kinds of sensation differ greatly in the extent to which they can afford data for knowledge of external things. Taste and smell are of least use in this respect; but they have been called "the servants of the body," because as a rule they inform us of organically injurious substances in the atmosphere or in food. Sight and hearing are of so much more importance than all the others, from the point of view of knowledge, that they have been distinguished as the "higher" or "intellectual" senses.

§ 3. *Sense of taste.*—The organ of the sense of taste is the mucous membrane covering the tongue (the back being the most sensitive) and the soft palate. At the

[1] A fourth aspect of sensation, described in many text-books under the name of "extensive quality" or "extensity," will be discussed in connection with the psychology of space-perception.

back of the tongue, and extending also to its tip and edges, are minute protuberances (papillæ) in which are the nerve-endings for taste. These can be stimulated only by substances in solution; hence only soluble substances can be tasted. There appear to be four different *qualities* of taste,—"sweet," "bitter," "salt," "sour." Wundt adds two others, "metallic" and "alkaline"; but it is very doubtful whether these are really distinct qualities. Others reduce the number of such qualities to two, "sweet" and "bitter," on the assumption (extremely difficult to verify conclusively) that some of the qualities mentioned in the fourfold classification are compounds. It is quite true, however, that many of what we call tastes are not only compound but are compounded with sensations other than taste. (*a*) In some cases there is a mixture of organic sensations due to the continuity of the tongue with the alimentary canal. By this means tastes are complicated into what we call "relishes" or "disgusts." We may have the one without the other; thus, after sickness, we can discriminate "sweet," "bitter," &c., but nothing excites a relish. (*b*) In the case of a taste like alum, or fiery tastes like pepper or mustard, there is a mixture of true taste with muscular sensations; the stimulation is strong enough to cause reflex contractions of the muscles of the tongue. (*c*) The tongue is supplied with nerves for touch and temperature as well as taste, the tip being highly sensitive to touch. Hence when we take any solid or liquid food into the mouth we are able to feel its size, shape, smoothness, &c., and its temperature. It is certain that some of the sensations usually called tastes include the effects of touch. (*d*) Finally, tastes are complicated with smells, owing to the proximity of the organs. During a cold, when the nostrils and the

passage to the throat are obstructed, we "lose some of our sense of taste,"—that is, we lose what the other sense contributes to the supposed "taste." It is said that in case of severe impairment of the sense of smell, it is not possible to distinguish the taste of a piece of apple in the mouth from that of a piece of onion, if the tongue is touched with the two in succession.

Sensations of taste cannot be arranged in any kind of continuous series, like those of sound or colour; there are no gradual transitions from one taste-quality to another. They vary in what, for want of a better word, we have called "massiveness," according to the extent of surface acted on,—and in intensity, according to the degree of concentration of the solution of the sapid substance.

"Taste," says Professor M'Kendrick, "may be educated to a remarkable extent; and careful observation —along with the practice of avoiding all substances having a very pronounced taste, or having an irritating effect—enables tea-tasters and wine-tasters to detect slight differences of taste, more especially when combined with odour so as to produce flavour, which would be quite inappreciable to an ordinary palate." It is also well known that two tastes felt in succession may affect one another. A strong taste will affect another taken immediately after it; thus, sweetness will affect bitterness, and *vice versa*. This is a phenomenon of a type which we shall meet with again,—sense-contrast.

On the sense of taste, see Myers, *Text-book of Experimental Psychology*, 3rd ed., vol. i., ch. 8, and the corresponding portions of vol. ii.; Titchener, same title, vol. i. ("Qualitative"), pt. ii. ("Instructor's Manual"), ch. 4, and the corresponding chapter in pt. i. ("Student's Manual"); Haycraft in Schäfer, *Text-book of Physiology*, vol. ii. pp.

1237 ff.; W. H. R. Rivers in Foster, same title, pt. iv., ch. v., §§ 3, 4; Külpe, *Outline of Psychology*, § 12.

§ 4. *Sense of Smell.*—The end-organs of the sense of smell are in the mucous membrane in the upper part of the nostrils. The stimulus consists of extremely minute particles given off by a body and conveyed to the membrane in a gaseous medium, usually a stream of air. Heat and moisture assist in spreading odours, because they help decomposition and evaporation.

The minimum quantity of material required to produce a sensation of smell may be in some cases, as in that of musk, almost immeasurably small. A grain or two of musk will scent an apartment for years, and at the end of the time no appreciable loss of weight in the substance can be detected. When the air conveying any odour is filtered through a tube packed with cotton wool—excluding particles even less than ·00001 of an inch in diameter—a smell may be still discernible.

In the life of animals the sense of smell plays an extremely important part,—as important for their life-interests as sight and hearing are for ours. With them, it is capable of a degree of fine discrimination which is beyond the possibilities of our experience; probably every species of living things and every individual has its own characteristic and distinctive odour. This fineness of discrimination appears to depend on the area of the sensitive surface; animals possessing it have a proportionally large area of olfactory membrane. Hence in animal life this sense comes to be of the greatest cognitive value, and involves the possibility of a great variety and extent of vivid impressions of smell, with their corresponding memory-traces, and

the formation of strong emotional moods capable of being excited by such impressions. Professor G. F. Stout quotes an interesting investigation showing how, among ants, "the unfamiliar odour of an ant coming from a strange nest has an exasperating effect: the intruder is attacked and usually killed." There is no *recognition*, in any proper meaning of the word; "all depends on the irritating effect of the unfamiliar odour of strangers."[1] The part played by this sense in animal life is fairly summed up in an epigram of the late Mr F. H. Bradley, the distinguished philosopher: "My dog's system of philosophy—if he had one—would be this: What exists, smells; and what does not smell, does not exist."

On the other hand, it is important to observe that smells are not adapted to *ideal revival in serial succession* as sights and sounds are; they cannot form such connected recollections of past experience as can form the basis of rational judgment. Such trains of ideas obviously constitute a very large part of our experience; and this, together with the immensely larger development of sight, hearing, and touch in human life, has left the sense of smell in a comparatively insignificant position.

In human experience, we find that the greater the quantity of odoriferous material conveyed to the membrane, the more intense the sensation up to a certain limit; but if the stimulus is continuous, the sense is soon dulled, even in the case of powerful or highly unpleasant odours. This fact is probably due to exhaustion of the sensory terminal organs. A mechanical explanation has also been suggested,—that the olfactory

[1] *Manual*, bk. ii., ch. iv., pp. 362, 363.

membrane becomes quickly coated with a thin layer of matter which prevents the odoriferous material coming into contact with the pure surface, and so producing its most intense effect.

Beyond the broad distinction of odours as agreeable and disagreeable, it is extremely difficult to classify them. They are often mixed with touch and taste sensations: sometimes with organic sensations, as in the "fresh smell" of pure air as contrasted with the "stuffy smell" of a storehouse or the like; or again with tactual sensations, as in the effect of smelling-salts or snuff. The "pungency" of an odour is nothing but a special kind of tactual experience; and sneezing appears to be due not to any odour as such, but to irritation of the sense of touch in the mucous membrane.

We have observed that the sense of smell in human beings is not capable of the discriminative power which belongs to it among the lower animals. There is no doubt, however, that, if required, its power could be increased by training. "I know of one family," says Mr Judd, "where, through the persistent efforts of the father, the children have been so trained in the detection and discrimination of odours, that they can identify their friends in the dark through their keen olfactory sense."[1]

On the sense of smell, see Myers, *Text-book of Experimental Psychology* (3rd ed., 1925), vol. i., ch. viii., and the corresponding portion of vol. ii. (Myers and Bartlett, instructions for experiment); Titchener, *Text-book of Experimental Psychology*, vol. i. ("Qualitative"), pt. i. ("Instructor's Manual"), ch. v., and the corresponding

[1] Judd, *Genetic Psychology for Teachers*, p. 134.

chapter in pt. i. ("Student's Manual"); Haycraft in Schäfer's *Text-book of Physiology*, vol. ii. pp. 1246 ff.; W. H. R. Rivers in Foster's *Text-book of Physiology*, part iv., ch. v., §§ 1, 2; Külpe, *Outlines of Psychology*, § 13.

§ 5. *Cutaneous Sensations.*—It has been proved that, scattered over the surface of the body, are numerous so-called "spots," in other words, minute areas of the skin, some of which are more sensitive to one kind of stimulus than others. By careful exploration of the surface of the skin such spots have been discovered corresponding to the different kinds of sensation which we experience through cutaneous stimulation: touch, heat, cold, and pain. They correspond to different kinds of end-organs in the skin, and the nervous impulses are conveyed to the brain by different groups of fibres. The four kinds of spots are intermingled together, but in some parts of the skin one variety predominates, in another part, another variety. Hence sensitiveness to these different kinds of stimulus varies in different parts; the tip of the tongue and the tips of the fingers are specially sensitive to touch, the cheek or the fore-arm to heat. On the whole the spots yielding heat are least numerous, and pain spots most numerous. In the cornea, the transparent outer covering of the eye-ball, only pain-spots occur.

(i) The touch-spots are best explored by slight pressure; for instance by an "æsthesiometer" consisting of a horse-hair suitably mounted in a holder, in which it can move backward and forward, producing slight variations of pressure. Touch-spots are most numerous round the hair-follicles where special end-organs are found, and in certain hairless parts where the "touch corpuscles" of the skin abound, as in the fingers and toes.

By similar means, it is possible to test the "absolute sensibility" of touch; in other words, the lightest weight that will produce a sensation of touch in different parts of the body.

The comparative discriminative sensibility of touch may be tested by placing one small weight after another on the same spot, in order to ascertain the smallest noticeable difference (reference to muscular sensations being excluded).

The local discriminative sensibility of touch may be measured by testing the smallest distance between two points (in contact with the skin) which are distinguishable as two. For this an instrument like a pair of compasses is employed. If the subject, who has his eyes shut, can distinguish two points of contact with the skin, the compass-points being at a known distance apart, that is a measure of local discrimination at that part; the distance is narrowed and the result again ascertained, until a distance is reached where the points cannot be distinguished as two.

Localisation in the case of skin-sensations is tested by ascertaining how far the subject, having his eyes shut, can accurately say *what part*, for instance, of his arm or hand, is being touched. It must be observed that any localisation at all of our sensations is an acquired perception. We learn to localise at all by degrees. The external stimulus, in the case of sensation, is propagated to the brain; but the sensation is localised not in the brain but in some part of the body. The young child has a very imperfect sense of localisation; he does not localise pain, but has a general sense of discomfort. In abnormal cases we may discriminate the position of a sensation in a part of the body which no longer exists; after the amputation of a

limb the patient will still feel pain, for instance, "in" his foot, because he has been accustomed to localise such feeling there whenever particular nerves are stimulated.

Organic skin-sensations, such as "tickling" or "tingling," have to be carefully distinguished from touch. In the experience of being *tickled* there is a certain element of true tactual sensation,—that of gentle contact, which is rapidly intermittent, and which commonly shifts from one point of the skin to adjacent points; but the whole effect with its large element of feeling involves the action of the nerves of organic sensation as well.

With regard to qualities of touch-sensation, ordinary language distinguishes "hard," "soft," "rough," "smooth." The first two, so far as they are distinct from muscular sensations, are simply cases of greater or less intensity of pressure. The difference between "rough" and "smooth," again, so far as it depends on touch alone, is connected with "continuity or uniformity of pressure in the one case, and discontinuity or inequality in the other." In laying the hand upon a polished surface the pressure is uniform at all contact points, and the points are comparatively speaking continuous. A "rough" surface offers masses of irregular and discontinuous points.

Touch combined with muscular movement becomes one of the most important sources of our knowledge of space-relations, and has been distinguished as "active touch."

(ii) Temperature spots are best explored, in the case of heat, with a small hollow metallic pencil, kept warm by mechanical means. As it is moved over the surface it will feel noticeably warmer at the heat spots. Cold spots may be explored similarly with a cold pencil.

The information which we get by sensations of temperature is of relative character, not absolute; in other words, a person's sensations of warmth or cold depend on his own state,—they are "subjective." If I have three bowls of water, the first hot, the second lukewarm, the third cold, and if I dip one hand in the first, and the other in the third, and then dip both hands in the second, the latter will feel cold to one hand and warm to the other. We may generalise this result and say that anything warmer than the surface of the body will feel warm, anything colder than the surface of the body will feel cold. Bodies having the same temperature as the part of the skin which they stimulate give no distinct sensations of warmth or cold; the normal heat of that part of the body is called the zero-point *of temperature sensation.*

As in the case of touch, discriminative sensibility for temperature varies greatly in different portions of the body. Keen discrimination of temperature is found only near the zero-point. The zero-point is not the same for all parts of the body, since the surface temperature of all parts is not the same; for instance, the hand is usually cooler than the brow.

(iii) Pain spots are best explored with a needle mounted in a holder containing a spring which registers the pressure necessary to arouse a painful sensation. Even if a cold or hot needle is used, a pain spot will yield only a pain sensation. Cutaneous pain, therefore, is a specific kind of sensation, as it were, resident in these minute spots of peculiar sensitiveness to pain, interspersed among the touch and temperature spots in the skin. It is now no longer necessary to point out that this fact—the occurrence of pain as a sensation at certain points in the skin—does not

warrant the conclusion that all modes of painful feeling are sensations. Feeling remains one of the "three inseparable factors of mental life" (see above, ch. iv., §§ 6, 8).

When the first edition of this book was published, in 1907, the existence of any *pain-sensation,* in the proper meaning of the words, was treated as still an open question. For some time it had been the subject of controversial discussion among competent students of physiological psychology. The evidence, as it stood at the end of the nineteenth century, is summarised in Höffding, *Outlines of Psychology* (Eng. tr.), pp. 223, 224. The pain-sensation theory found strong support, but such writers as H. R. Marshall, *Pain, Pleasure, and Æsthetics* (ch. i., § 4, pp. 15-22), Lehmann, *Hauptgesetze des Menschlichen Gefühlslebens*, and Ribot, *Psychology of the Emotions*, pt. i., ch. i. (Eng. tr.), pp. 26-29, 37-39, and others who might be named, found themselves forced by the facts to conclude that in a "painful sensation" we can *distinguish* the "sensation" and the "pain," which is not just an aspect of the sensation as its "intensity" is. Subsequent discussion, however, has shown that this general conclusion is not inconsistent with the fact that the skin is capable of yielding a specific kind of pain which is itself a sensation, and is not aroused by a sensation distinct from itself. For full discussion of the subject, see *Psycho-Physiologie de la Douleur*, by J. Joteyko and M. Stefanowska, "Bibliothèque de Philosophie Contemporaine," Paris, 1909.

On cutaneous sensations, see Stout, *Manual of Psychology*, bk. ii., ch. iii.; Myers, *Text-book of Experimental Psychology*, vol. i., ch. ii. (also vol. ii. for experiments); Titchener, *Text-book of Experimental Psychology*, vol. i., part ii., ch. 3 (also pt. i. for experiments); Sherrington in Schäfer's *Text-book of Physiology*, vol. ii. pp. 920 ff.; Rivers in Foster's *Text-book of Physiology*, 1900, pt. iv., ch. vi.; Külpe, *Outlines*, 1909, §§ 10, 11 (on Touch and Temperature).

(iv) In recent years a series of investigations have been carried out by Dr Henry Head, Dr W. H. R.

Rivers, and a group of collaborators, which have become famous among students of neurology and physiological psychology. A brief account of the work is required here, as far as it bears on the analysis of cutaneous sensations.

Dr Head severed a cutaneous sensory nerve in his own arm, and in conjunction with Dr Rivers noted accurately the date and other particulars of return of function as the nerve regenerated itself. The results were confirmed by other experimental and clinical observations.

The patch of skin served by the divided nerve became entirely destitute of sensibility. But the underlying parts were sensitive to pressure exerted through the insensitive skin; and if the pressure was severe enough, pain was felt. This Dr Head describes as "deep sensibility." It is served by nerves distributed with those of muscular sensibility.

About forty days after the operation, a real cutaneous sensibility began to appear, and by about the hundred and twentieth day had established itself. It had a distinctive character of its own, which Dr Head describes as "protopathic" sensibility. It enabled him to feel pain in the skin, at the usual pain spots, and touch, but only through contact with the hairs; to distinguish only large differences of temperature; and to localise imperfectly. By protopathic sensibility alone, the heat and cold spots reacted respectively only to temperatures above 37° C. (=about 98.5° F.) and below 26° C. (=about 79° F.); the sensations radiated widely and often were wrongly localised.

After a further period, normal cutaneous sensibility began to return; but many months elapsed before the full range of tactual sensation was restored together

with the power of distinguishing small differences of temperature and the finer differences of skin-sensation generally. This type of sensibility Dr Head calls "epicritic" (*i.e.*, discriminative).[1]

We have therefore the following classification. Sensibility to stimuli transmitted through the skin is of two kinds: (*a*) "deep," (*b*) cutaneous, and the latter is of two kinds, (*b* 1) "protopathic," and (*b* 2) "epicritic." This division does not contradict the one given above; it merely has a different basis.

Dr Head holds that protopathic and epicritic impulses are transmitted by different nerve-fibres; but this is an unsettled question. Some other investigators (see Head, *Studies in Neurology*, vol. ii., appendix) fully confirm the distinction between cutaneous and deep sensibility, but do not confirm the distinction of protopathic and epicritic *nerve-fibres.* There is, however, obviously a difference between accurate or definite and inaccurate or vague sense-discrimination; and in reference to this distinction, the terms may be retained.

§ 6. *Motor sensations.*—When a baby stretches its hand towards an object, it sees the movement; when it laughs or cries, it hears its own voice. All these *remote* effects of movement, as Professor James calls them, go to form motor memories. But we *feel* the movement of a limb even when we do not see it. We never fail to know in what position our arm is, even if it is moved by some other person, our eyes being shut. This knowledge comes to us by way of sensory nerves which have their endings in the muscles, tendons, articular surfaces, skin, and ligaments, and to this region the sensations are referred by consciousness. These *resident* effects of movement are termed

[1] Hence it is suggested that "heat" (protopathic) and "warmth" (epicritic) are different kinds of sensation, and similarly with "cold" and "coolness."

"kinæsthetic" sensations. Usually we pay no attention to them, because as sensations they are of no importance; it is only their *meaning* that matters. If the reader will stretch out his arm, shut his eyes, and slowly bend his elbow-joint, paying careful attention to the manner in which he is aware of the direction, velocity, and duration of the movement, he will realise the nature of kinæsthetic sensations. If he continues this movement, endeavouring to make the lower arm press on the upper as closely as possible, he will perceive that the sensations localised in the muscle grow painful. As a second experiment, let him endeavour to lift a weight which is too heavy for him. Are the sensations of effort which he now experiences purely kinæsthetic, or does he have direct knowledge of the amount of energy he is sending forth from the centres? Bain chose the latter of these alternatives, believing that our muscular sensations are the immediate result of the cerebral initiation of an efferent nerve-current, and vary with the intensity of that current. This hypothesis is now abandoned. There is nowadays no question but that our sensations of movement come by way of sensory nerves, and are thus on a par with other sensations. The only living form of the question is this — Have we any direct knowledge of our own activity as a mental process, apart from incoming sensations and memories of past sensations? An affirmative answer to this question has been defended above (ch. vii., § 12).

When we speak of "motor sensations," in the stricter meaning of the term, we refer to the sensations localised in the muscles, tendons, and joint surfaces. Sensations localised in the *muscles*, apart from those of muscular strain and fatigue (see above, ch. vi., §§ 3, 4), are difficult

to discriminate and analyse. It appears, however, that afferent nerves having their roots in the *tendons* produce sensations on the basis of which we can discriminate *degrees of strain*, as when weights of varying amounts are attached to the forefinger when your arm is hanging down loosely by your side. A fairly heavy weight attached to the finger by a string pulls the surfaces of the elbow and other joints slightly apart, so that you have no sense of the movement of these surfaces against one another, and can more easily concentrate your attention on the muscles and tendons.

When we come to sensations localised in the *joint surfaces* we find much finer discriminative power, though not comparable to the epicritic sensibility of the skin (see § 5, p. 289). Here the experiments of Goldscheider have become classical. We quote the account of them given by William James.[1] "This patient observer caused his fingers, arms, and legs to be passively rotated upon their various joints in a mechanical apparatus which registered both the velocity of movement impressed and the amount of angular rotation. No active muscular contraction took place. The minimal felt amounts of rotation were in all cases surprisingly small, being much less than a single angular degree in all joints except those of the fingers. . . . Anæsthesia of the skin produced by induction currents had no disturbing effect on the perception . . . [which] became, in fact, all the more distinct in proportion as the concomitant pressure-feelings were eliminated by artificial anæsthesia. When the joints themselves, however, were made artificially anæsthetic, the perception of the movement grew obtuse, and the angular rotations had to

[1] James, *Principles*, vol. ii. pp. 192, 193.

be much increased before they were perceptible."[1] James points out an interesting and important fact in this connection. "There is not a direction in the real world, nor a ratio of distance, which cannot be matched by some direction or extent of joint-rotation. Joint-feelings are 'roomy' [having an intrinsic spatial quality]. Specific ones are contrasted *inter se* as different directions are contrasted within the same extent. If I extend my arm straight out at the shoulder, the rotation of the shoulder-joint will give me one feeling of movement; if then I sweep the arm forward, the same joint will give me another feeling of movement."[2]

We have said that the meaning which motor sensations are capable of conveying, by themselves, is usually merged and lost in their *acquired meaning*, which alone normally interests us. Professor Stout observes that a more or less parallel case is found in the use of such instruments as a pen, or a knife and fork, or the stick with which a blind man guides his steps.

It is evident that this process of acquisition of meanings by successive associations may be continued until the final meaning of the muscular movement, the meaning with which we identify ourselves in voluntary decision, may be very "remote" (as James expresses it) from the original; "an *end*, consented to, . . . innervates directly the centre of the first movement of the chain which leads to its accomplishment; and then the whole chain rattles off *quasi* reflexly." See above, ch. v. (esp. § 2) and ch. vii., §§ 10, 11; and James' brilliant analysis of volition, *Principles*, vol. ii., ch. xxvi., esp. pp. 518ff.

The "central innervation" theory, of Bain and others, maintained that consciousness accompanies the nervous activity which innervates the motor nerves and regulates its amount. Owing to the development of knowledge it is

[1] They are good examples of "change-sensations" (see Watt, *British Journal of Psychology*, vol. iv., pt. ii, p. 157).

[2] James, *ibid.*, p. 194.

now impossible for any one to hold the theory in its crude original form; its value has been that it roused its opponents to lay stress on those kinæsthetic sensations which had previously been overlooked, and so opened the way for a truer theory of movement. It seems impossible to detect any phase of consciousness corresponding exclusively to the excitement of the motor neurones; nothing, in the way of additional sensory experience, appears to come between the idea of the movement (however "remote") and its execution. The best critical examination of the "innervation" theory will be found in James, vol. ii. pp. 492-518. For a brief presentation and criticism of Wundt's modified form of the doctrine, see McDougall's *Physiological Psychology*, "Temple Primers," p. 88. An interesting feature of this (now obsolete) discussion is, that the existence of a sense of centrally-initiated efferent innervation was maintained by some who denied any specific or distinctive *consciousness of mental activity* as such. In effect, they admitted a specific or distinctive feature in our experience of activity, but found it in a (supposed) peculiar kind of sensation; and when this latter assumption was also rejected, the inevitable conclusion was that we have no consciousness of activity at all. It is completely "explained away," so far as psychology is concerned. In Münsterberg's *Willenshandlung*, this paradoxical conclusion is brilliantly expounded (see above, ch. vii., § 12): cp. criticism in Pringle-Pattison, *Man's Place in the Cosmos*, 2nd ed., p. 73 ("Psychology and Automatism").

On our motor sensations, see Myers, *Experimental Psychology*, 3rd ed., vol. i., ch. v. (cp. also ch. xiv. and xvi.); Sherrington in Schäfer's *Text-book of Physiology*, vol. ii., pp. 1002ff.; W. H. R. Rivers in Foster, same title, pt. iv., ch. v. In the *British Medical Journal*, 31st Jan. 1925 *et seq.*, the reader will find reports of a series of lectures on the *Innervation of Striated Muscle*, by the late J. H. Hunter, in which it is maintained that different fibres are concerned in the two main functions of muscles, (*a*) execution of movement, (*b*) maintenance of posture.

§ 7. *Sense of hearing.*—The normal physical stimulus arousing sensations of sound is vibration or wave-motion of the air, communicated to it by the vibration of the "sounding" body. These throw the membranous "drum," at the end of the passage of the outer ear, into a condition of vibratory motion. The middle and inner ear, which are cavities hollowed out of the bone of

the skull, contain a series of extremely complex and delicate structures by which the motion of the drum is transformed into a stimulus capable of affecting the auditory nerve-terminals.[1] No sensation of sound arises until the nervous impulse is transmitted to a particular area of the brain. The details of the mechanism of the various parts of the ear are described in the text-books of physiology; it is a complicated structure which at present throws little or no light on psychological questions.

In classifying sensations of sound, we find a broad distinction between musical sounds, "tones" or "notes," on the one hand, and non-musical sounds or "noises" on the other. Musical sounds depend on regular or periodic vibrations, noises on irregular or non-periodic vibrations.

To excite a sensation of sound at all, a certain number of vibrations must occur in a given interval of time. The lower limit is about 25 vibrations per second, and the upper limit about 20,000. Below 25, we should not hear the vibrations but feel them as puffs of wind. At the upper limit, however, people differ very much, both individually and at different ages.[2] The chirp of a cricket or the squeak of a bat is inaudible to some: but the power of hearing high notes has nothing to do with general acuteness or dulness of hearing. For musical purposes only a comparatively small portion of this range can be used with advantage,—from about

[1] The nerve-terminals of the inner ear may also be affected by vibrations of the bony wall of the cranium. In like manner we may experience peculiar auditory sensations, such as blowing or hissing sounds, due to muscular contraction or the passage of blood in vessels close to the inner ear.

[2] See page 298 below.

40 to about 4,000 vibrations per second, covering thus from 6 to 7 octaves.

In musical sounds three characters are prominent: pitch, intensity, and quality (French *timbre*, German *Klang*).

Pitch, as a sensation, depends on the frequency of the vibrations of the sounding body. The greater the number of consecutive vibrations which fall upon the ear in a second, the higher is the pitch. Hence the pitch of a sound is determined by the *length* of the wave; a low note having long and a high note short wave-lengths. Thus we are able to distinguish a whole series of musical sounds of different pitch, from the lowest to the highest audible note. The ear (except in the case of "tone-deaf" persons) can distinguish much finer differences of pitch than the "tones" and "semi-tones" of the modern musical scale. Practised musicians can distinguish a difference of pitch amounting to a small fraction of a semi-tone: but this is far beyond average attainment.[1] The *intensity* of a note depends on the amplitude of the vibration, occasioned by the force with which the string is pulled out of its place.[2] A greater or lesser amplitude of the air-waves causes corresponding movements of the ear-mechanism, and a corresponding intensity of stimulation of the nerve-terminals. The *quality* or *timbre* of a note is that peculiar characteristic of a musical sound by which we may identify it as proceeding from a particular instrument or a particular human voice. It depends on the number of "overtones" produced by any musical note whose pitch is heard. These overtones

[1] See page 299 below.

[2] The *amplitude* of a wave must be distinguished from its *length*. Waves of the same length may differ in the height of their crests and the depth of their hollows: this is their "amplitude."

(also called "harmonics" or "partial tones") find their physical explanation in the fact that when, for example, a string is struck, not only does it vibrate in its entire length and so transmit the fundamental tone to the air, but either half of it vibrates also, though with far less amplitude, and so produces the octave. In the same way each third and each quarter of the string vibrates, thus producing the fifth of the higher octave, the double octave (a fourth higher), and so on in decreasing series. The number and intensity of these harmonics differ in different instruments.

The harmonics are related to the fundamental tone as a series of multiples of its vibration rate; thus, if we call the fundamental tone do^1 (vibration-rate 33), the harmonics are—

Notes . . .	do^2	sol^2	do^3	mi^3	sol^3	si$^3\flat$	do^4	re^4	mi^4
Vibration-rates .	66	99	132	165	198	231	264	297	330

Professor Stout has observed that the combination of such partial tones in a complex note illustrates a psychological law of great interest. The combination of tones yields not merely the sum of the separate experiences of the separate notes but a new specific experience of the combined effect of these partial experiences,—a *new whole*. Even when the constituent tones are discriminated,[1] they are still apprehended as integral parts of the whole which has its own characteristic quality (*Manual*, bk. ii., ch. vi., §§ 6, 8).

Thus many waves of sound that reach the ear are really compound wave-systems, built up of constituent waves. The compound wave excites a sensation with a characteristic quality, and each of the constituent waves excites a sensation which can be discerned if singled out and reinforced by a resonator,

[1] It must be added that in discovering the overtones by analytic attention we do not create them but find them. They were there before, undiscriminated, but making their presence *felt* in the whole.

and which may sometimes be heard without a resonator, after special practice and training. The difficulty is due to the great difference of intensity between the fundamental tone and the overtones.

When a simple tone, or one free from harmonics, is heard, it gives rise to a soft and somewhat insipid sensation, such as is yielded by a tuning fork. The lower harmonics added to the fundamental give richness of tone; the higher ones produce a brilliancy of tone, as with the brass instruments of an orchestra.

When two or more musical sounds occur together, we have harmony or discord. This depends on the proportions of the rates of vibrations; thus, when one note is produced by a rate of vibration twice as fast as that of another, we have the most perfect harmony, the octave. Then we have the "fifth," where the proportion is two to three; the "fourth," where it is three to four; and so on, up to a point where the harmony fades away into discord. The harmonious connection of notes in succession (melody) and simultaneously (harmony proper) constitutes the art of musical composition, complicated with other effects produced by time, emphasis, contrasts of intensity, &c.

Sounds and noises may vary in massiveness or voluminousness. This happens when the sound comes from a sounding mass of large surface or extent—for example, the shout of a great multitude, the waves of the many-sounding sea, the thunder, or the wind, when compared with the sound of a single voice or the trickling of a stream. This brings us to non-musical sounds or noises. The precise nature of the effect which they produce is not understood: there is little doubt, however, as already remarked, that they involve a rapid and irregular variation of rates of

vibration; so that many noises are really a combination of numerous constituent sensations. Between a pure and simple musical sound produced by a series of vibrations, each of which has exactly the same period, and a harsh noise in which no consecutive vibrations are alike, there are numerous intermediate stages. Much irregularity may present itself in a series of sounds called music, and in some of the roughest noises the regular repetition of one or more vibrations may be easily recognised,—hence the "music of nature."

We have made reference, in the earlier part of this section, to the range of sensibility to tones and to the discrimination of differences in pitch. Professor R. M. Ogden[1] quotes some interesting facts in this connection. "Sensibility to tones in the higher range of pitch gradually decreases with age. Thus Gildenmeister[2] found that children could hear tones of 20,000 v.d. (*i.e.*, complete vibrations per second); but persons in the middle thirties rarely heard a tone above 15,000 v.d.; while at the age of fifty the upper limit had been reduced to 13,000 v.d. . . . These results were obtained with a constant medium intensity; with increased intensity, however, audible pitch could be almost indefinitely raised."[3]

With regard to discrimination of pitch, Professor Seashore[4] found that, among 1265 university students tested, 1 per cent were able to distinguish a difference

[1] R. M. Ogden, *Hearing*, London, 1924 (containing a useful bibliography of recent work).

[2] "Untersuchungen u. d. obere Hörgrenze," *Zeitschrift f. Sinnesphysiologie*, 1918.

[3] Ogden, p. 278.

[4] Seashore, *Psychology of Musical Talent*, Boston, 1919, pp. 65-67; quoted by Ogden, *op. cit.*, pp. 313-315.

of pitch corresponding to a difference of one quarter of a vibration about a standard tone of 435 v.d.; 12 per cent could *not* distinguish a difference of less than one vibration; 31 per cent, two vibrations; 23 per cent, three; 14 per cent, five; 9 per cent, eight; 4 per cent, twelve; 3 per cent, eighteen; 2 per cent, twenty-five; 1 per cent, thirty-four.

Professor Seashore considers that those who can discriminate pitch-differences corresponding to less than 3 v.d. (with 435 v.d. as standard) may become musicians. Those whose discrimination falls between 3 and 8 v.d. should have a plain education in music (school singing may be obligatory). Those whose discrimination falls between 9 and 17 v.d. should have a plain education in music only if a special inclination for some kind of music is shown (singing in school should be optional); while those whose discrimination is 18 v.d. or over "should have nothing to do with music."

It should be noticed that the tests were taken round a standard rate. Seashore holds that we have here an elementary capacity of the organ of hearing, whose limits can be ascertained with sufficiently careful tests eliminating various subjective disturbances. The observations are quoted because they evidently open up a fruitful field of inquiry.

The following references may be given for the general subject of the foregoing section. The classical treatment of sound-sensation, from the point of view of physics, of physiology, and of psychology, is in Helmholtz's great work, *The Sensations of Tone* (Eng. tr. by A. J. Ellis, 1875). Stumpf's *Tonpsychologie* perhaps comes next in importance. The most important recent works are Dr H. J. Watt's two volumes *The Psychology of Sound* (1917) and *The Foundations of Music* (1919). Edmund Gurney's *Power of Sound* is not a psychological treatise in any technical sense; but it is as stimulating and instructive to-day as when it was first published.

On the experimental and physiological side, the following references are important: Myers, *Text-book of Experimental Psychology*, 3rd ed., vol. i., ch. iii., iv., xxi., and the corresponding portions of vol. ii.; Titchener, same title, vol. i., pt. ii., ch. i.; Külpe, *Outlines*, 3rd ed., §§ 14-16 and 43-48; Rivers, in Foster, *Text-book of Physiology*, pt. iv., ch. iv.; M'Kendrick and Gray, in Schäfer, same title, vol. ii. pp.

1149ff. On the connection between the organs of the inner ear and our sense of bodily equilibrium, see Myers, *op. cit.*, vol. i., ch. v.

§ 8. *Sense of sight.*—The physical stimulus of vision consists of radiations emitted by bodies at high temperatures. Objects at high temperatures become self-luminous; in other words, send out radiations capable of stimulating our organ of vision: such are flame, red-hot iron, the sun, the stars, &c. Most objects are visible only by reflection from those which are self-luminous.

These radiations are undulatory movements of measurable velocity, frequency, and length. To emit radiations or wave-motions is a characteristic of the elementary atoms of matter, whenever the movements of the electric particles constituting the atoms are re-adjusted or re-arranged. They are now usually described as electro-magnetic radiations or waves. Their range is vast; but only a small series of them is *visible* by us (see § 1, above).

Visible undulations were formerly described as vibrations of the "ether," a medium assumed to pervade all space, and not "material" so far as "material" means "having weight"; and as the existence and properties of this medium were thought out specially in connection with the phenomena of light, it was called the "luminiferous ether." This hypothesis is now in a much less secure position, and has been abandoned by many students of the subject. The *form and structure* of the waves or undulatory radiations is to a certain extent understood; but we have no knowledge of *what it is* that moves thus.

Detailed description of the organ of vision will be found in the physiological text-books. We shall mention only those facts which have a direct bearing on the psychology of vision.

(i) Just within the transparent portion of the front

of the eyeball (the *cornea*) is a round curtain called the *iris*, with a central opening, called the *pupil*, through which the light enters. The iris is provided with muscles which act reflexly, and enlarge or contract the pupil according to the less or greater intensity of the light. Immediately behind the iris is the double-convex *crystalline lens*, surrounded by the very important *ciliary muscle*, by which alterations in the convexity of the lens are effected, to accommodate the eye to nearer or more distant objects. The contraction of the muscle compels the lens to assume a more convex shape, thus accommodating itself to light proceeding from a nearer object. This is accompanied by contraction of the pupil. Accommodation for the near is the more *active* change;[1] when we look far off, the ciliary muscle is passive and the lens less convex.

(ii) The *retina*, in which the process of vision begins, covers the inner surface of the eyeball at the back. It consists of several layers, of which the posterior one contains the proper organs of vision. These consist of multitudes of elongated bodies arranged side by side like rows of palisades and vertically to the surface of the retina. Some of these bodies are cylindrical, and are called the *rods* of the retina; others are flask-shaped, and are called the *cones* of the retina. The cones are shorter than the rods, and are interspersed at regular intervals among them. The retina also contains minute blood-vessels and nerve-fibres distributed all over its surface; the latter communicate, by means of a complicated apparatus of cells, granules, and branches, with the rods and cones. The rods

[1] We shall see that convergence (of the two eyeballs) accompanies accommodation, and adds a further feeling of activity to the process.

and cones are the specific organs for taking up the influence of the waves of light; hence, as it has been observed, it is curious that these end-organs "are not pointed forward towards the light as it streams through the pupil, but backwards towards the choroid and sclerotic membrane, so that the light-waves traverse the translucent nerve-fibres and the cellular and granular layers of the retina before they touch the rods and cones themselves." Under certain conditions the shadows of the retinal blood-vessels can be distinctly seen; these shadows fall on the "rods" and "cones" behind the vessels, thus showing that the "rods" and "cones" are the real end-organs of vision. Almost exactly in the centre of the retina is an oval *yellow spot* about .08 of an inch in its long diameter. In the centre of this is a depression, the *fovea centralis*, which is the focus of clear vision for colour, form, and distinctness of impression. Here the "cones" are crowded together without any "rods"; the nerve-fibres bend round it, and the other layers of the retina disappear at this point. "The sensibility of the retina grows progressively less toward its periphery, by means of which neither colours, shapes, nor number of impressions can be well discriminated." About one-eighth of an inch to the inner (nasal) side of the yellow spot is the entrance of the optic nerve into the retina; here the retina is insensitive to light, and this portion of it is called the *blind spot*. The optic nerve is not itself sensitive to light; a process must take place in the "rods" and "cones" first. The optic nerve branches out into the retinal nerve-fibres which we have spoken of, and which communicate with the end-organs at the back of the retina.

(iii) The eyeball is moved by a set of six muscles

attached to it somewhat after the manner of the bridle to the horse's head. Were the retina directly exposed to the stimulation of light without the intervention of the lens, we should have only a diffused sensation of light and colour, comparable in character to the feeling of warmth. The function of the lens and the humours is to refract the rays of light which are reflected from the object, focussing them so that they converge on the retina, and every point in the part of the retina on which they converge corresponds to a point in the object. In this way the so-called retinal "image" is formed. The image of the part of the object on which the eye is directed falls on the *fovea*, which is the most sensitive part of the retina, and is situated exactly in the axis of the eye. The fovea of the yellow spot has a diameter of only .008 of an inch. If we close one eye and fix the other[1] on a word in the centre of this line, it is clearly and sharply seen, but the words towards each end of the line are vague. If we wish to see each word distinctly, we "run the eye" along the line—that is, we bring one word after another on to the yellow spot. Thus the field of distinct vision is extremely limited, and at the same moment we see only a very small portion of the visual field. Images of external objects are brought successively on this minute sensitive area, and the different sensations seem to be fused together, so that we are conscious of the object as a whole.

[1] To "fix the eye" on anything requires a careful effort of attention. Professor James observes that "it is almost impossible *not* to turn the eye the moment any peripherally lying object catches our attention, the turning of the eye being only another name for such rotation of the eyeball as will bring the *fovea* under the object's image."

In addition to being extremely minute, the retinal "image" is inverted; strictly speaking, however, it is not an "image," but a process in the rods and cones, which in turn starts a process in the optic nerve; and not until the latter has reached the brain is there any sensation of sight.[1] The student must beware of language which suggests that the "image" on the retina has any resemblance to the image on a photographic plate.

(iv) What additional phenomena come into play in the case of *binocular* vision? With two eyes we usually see a single field of vision; but there are really two sets of "images," one on each retina. We "see single" when we converge the axes of the two eyes[2] on the same object, so that its images fall on the two foveæ. In this case there is always single vision. The nearer we bring the object, the greater the effort to converge the axes; this is felt in the muscles. When the axes are accurately converged, each point in the object stimulates what are called *identical points* in the two foveæ. "Furthermore, if the eyeballs, instead of converging, are kept parallel, and two similar objects, one in front of each, cast their respective images on the foveæ, the two will appear as one." This is the first main principle applied in the stereoscope. Were it not for the central partition in the stereoscope we should see three pictures instead of one, —a central one, distinctly defined, and two vaguer ones; for, in addition to the combined picture, each eye would see the picture opposite the other eye. There are

[1] Light-sensations can also be produced by direct mechanical stimulation of the optic nerve, but not until the stimulus is transmitted to the brain.

[2] The axis of the eye is an imaginary line drawn through the fovea and the centre of the crystalline lens.

"identical" or corresponding points in other parts of the two retinæ; the outer side of one eye corresponds to the inner side of the other eye. When the rays of light from an object fall on corresponding points in the two retinæ, there is single vision; when they fall on non-corresponding points, we "see double."

Some persons' eyes converge almost always with difficulty, and they are always liable to see double. The possibility of double vision may, however, be illustrated in perfect eyesight. If the eyes are focussed on a distant object, and another object is suddenly held up near the eyes, the rays from the near object fall on the inner (nasal) parts of the two retinæ, and it is seen double. It follows that there must be innumerable double images which we never notice: all objects nearer or farther than *the point looked at* will produce them. The only explanation seems to be that we have *trained ourselves to habits of inattention* in regard to these double images; to notice them would not only be useless, but a positive hindrance to vision.

In the case of perfect convergence, the images on the two foveæ must be really a little different. Thus, in the case of a solid object comparatively near, the right eye will see more of one side of it, the left of the other. When this happens the mind judges that what is before it is a solid object. This is the second main principle applied in the stereoscope: the two pictures are photographs taken from slightly different points.[1] The spatial perception afforded by the eye will be further discussed below. The reader will remember that even in the case

[1] If the pictures are too different, or, say, differently coloured, they are still seen in the same place; but since they cannot appear as a single object, they appear there *alternately* displacing each other from the view. This is called "retinal rivalry."

of perfect convergence the point of single vision is very small, and the two eyes must always be moving and converging on successive points.

(v) The peculiar specific *qualitative differences* of sight-sensation are colours. What are called the primary colours are seen when white light is decomposed by the prism; it separates into the seven "colours of the rainbow," red, orange, yellow, green, blue, indigo, and violet. These colours shade into one another, and hence there are intermediate tints beside those named; but the seven colours stand out as obviously and broadly distinct from one another, and constitute the main differences of quality in sight sensation. They correspond to differences in the number of undulations per second in the radiations.

The succession of colours from red to violet corresponds to a gradually increasing frequency of the undulations: the dullest red light begins when they amount to about 375 billions per second; the darkest violet light ends when they have risen to about 750 billions per second. Since the speed at which the undulations move through space is uniform (see § 1), the wave-length of red (·00008 cm.) is twice that of violet (·00004 cm.).

By causing two rays, vibrating at different rates, to fall on the same spot of the retina—that is, by mixing rays of light—certain qualities of colour-sensation may be produced, sometimes inaccurately called "mixed colours."[1] Some of these mixed colours correspond to colours in the spectrum. The most important examples of mixed colours which do not occur in the spectrum are *purple* and *white*. The former is made by mixing red and violet rays; the latter, by mixing all the spectral

[1] Inaccurately, because it is not the *colours* that are mixed, but the physical stimuli.

rays together, or by mixing certain pairs of them, which are for this reason called "complementary colours." Thus red and greenish-blue, orange-yellow and indigo-blue, greenish-yellow and violet, all produce white.[1]

The mixing of the rays can be simply accomplished by Newton's method. Take a circular piece of cardboard, and paint on it the spectral colours ("pure" or "saturated": see below) in sectors of different angles. Professor M'Kendrick quotes from Newton the angles which the former used, as follows:—

Red	60° 45.5′	Green	60° 45.5
Orange	34° 10.5′	Blue	54° 41′
Yellow	54° 41′	Indigo	34° 10.5′
	Violet	60° 46′	

If such a disk is rotated with great rapidity, it will appear white.

Such facts show that each colour-sensation may be aroused by different combinations of physical causes. There are important physiological theories suggested by this complexity in the facts, carrying out in different ways the assumption of "a limited number of elementary retinal processes to which, when excited singly, certain 'fundamental' colours severally correspond. When excited in combination, as they may be by the most various causes, other colours, called 'secondary,' are felt." The most important theories are those of Helmholtz and Hering. Professor James has emphasised the following important point: "The 'secondary' colour-sensations are often spoken of as if they were compounded out of the primary sensations. This is a great mistake. The *sensations as such* are not compounded—yellow, for example, a 'secondary' on Helm-

[1] It will be observed that the mixing of colours, here spoken of, is a process quite different from the mixing of *paints*, with which it has nothing to do.

holtz's theory, is as unique a quality of sensation as the primaries red and green, which are said to 'compose' it. What are compounded are merely the elementary retinal processes. These, according to their combination, produce diverse results on the brain, and thence the secondary colours result immediately in consciousness. The 'colour-theories' are thus physiological, not psychological, hypotheses."

(vi) Besides quality, colours differ in intensity and purity or "saturation." Differences of intensity depend on the extent or amplitude of the vibrations, as distinct from their rapidity, and may range from the most sombre to the most brilliant shades. A great increase of intensity leads to a change of quality; at the maximum of intensity all varieties of colour tend to have a whitish appearance, and at the highest bearable intensity all alike become a dazzling white. At the lowest intensities they seem to fade away into a kind of grey. "In the dark all cats are grey."

Differences of purity or saturation depend on the greater or lesser admixture of white light with the colour. The colour is said to be saturated when there is no white mixed with it;[1] this is the case with the pure colours of the spectrum. Our ordinary colour-sensations produced by light reflected from objects are never pure. It is possible to vary the degree of purity of a colour by varying the amount of white light mixed with it. The resulting difference is sometimes so marked as to gain a different name. Thus "pink" is whitish purple; "lilac" is whitish violet.

When there is no stimulation of the retina at all, we have what is called "black." Whether black is a positive sensation, or whether it is no definite sensation at

[1] Here again we are speaking of the mixture of *rays of light.*

all, is a question very difficult to settle. The retina itself appears to be always the seat of internal changes which, even in the completest objective darkness that we can obtain, give rise to some faint luminous sensation, called the idio-retinal light.

(vii) Luminous sensations have a duration longer than the actual duration of the objective stimulus. This is due to the "persistence of impressions" on the retina,—the action in the retina goes on for an appreciable time after the exciting cause has passed away. This fact is applied in the well-known "cinematograph" and in a number of toys. It is also illustrated in the method for mixing colour-stimulations to which we referred (the revolving disk). The disk revolves so rapidly that the stimulations are superimposed on the retina. A luminous impression lasts for about one-eighth of a second in the retina, however brief the stimulus may be; hence if two luminous impressions are separated by a less interval, they are not distinguished as two. A flash of lightning is inconceivably brief, but as an impression lasts for an appreciable fraction of a second. After looking at a bright light, if the eyes are suddenly closed, a brief image of the light may be seen. These persistent images are called after-images, but "after-sensations" would be a more accurate designation. They must be distinguished as positive after-sensations, from the negative after-sensations which result from fatigue of portions of the retina. Negative after-sensations are illustrated in such a case as the following: after looking at a bright light, the part of the retina on which the light falls becomes, through fatigue, insensible to light; hence if we look at a comparatively dark background, as the wall of a room, we see there an image of the light in black, owing to the fatigued part not responding to the new

light-stimulus. Negative after-sensations are of longer duration according to the brightness of the light and the time we have been looking at it. When the bright object is of some particular colour, the negative after-sensation is of the complementary colour—*e.g.*, red and green. After looking intently at a bright red figure, on turning the eye to a white surface we see a green image of the figure. This is an example of a "complementary after-sensation," a variety of the negative after-sensations.

(viii) A few words may be added on one of the abnormalities of vision. People who regard as quite alike, or nearly alike, colours which to most other people are glaringly distinct, are said to be *colour-blind*. The most common form of colour-blindness is the inability to distinguish red and green. A cherry among the leaves of a tree, for example, is detected much more by *form* than by colour. Naturally, this incapacity takes different forms and degrees, in relation to different shades of red or of green. As far as can be ascertained, people thus affected see the spectrum in two colours only, one on each side of a neutral band in what to normal vision is blue-green.

We cannot tell what the actual sensations of the colour-blind are. No one has direct experience of any person's sensations but his own. By intercourse and comparison we find that the colour-sensations of most of us are broadly similar under similar conditions; and people whose colour-experiences diverge markedly from this general "norm" are called "colour-blind." A person who, having normal vision in one eye, was colour-blind in the other, could act as interpreter. "One such case," says Dr Rivers, "is recorded; and of him it is said that the sensation which he experienced in his colour-blind eye from the red end of the

spectrum resembled . . . the *yellow* of his normal eye.[1] Other observations tend to support the view that people affected by the red-green colour-blindness see only blue and yellow, with white and black. Another kind of colour-blindness, an inability to distinguish blue and yellow, occurs, but is rare and difficult to examine. There are, however, numerous cases on record of *total colour-blindness*, in which the colour qualities of objects are perceived only as shades of white and black. The spectrum is seen as a band of light of which the different parts differ only in luminosity.[2]

The literature on the sense of sight is even vaster than that on the sense of hearing. The principal facts, and methods of investigation, are conveniently summarised in Myers, *Text-book of Experimental Psychology*, 3rd ed., vol. i., ch. vi., vii., and xx., with the corresponding portions of vol. ii.; Titchener, same title, vol. i., pt. ii., ch. i.; Külpe, *Outlines of Psychology*, §§ 17-21, 49, 50; Foster, *Text-book of Physiology*, pt. iv., ch. iii.; Schäfer, same title, pp. 1026ff. The physiological theories of vision, connected with the names of Young and Helmholtz on the one hand, and Hering on the other, are fully explained and compared in these works.

§ 9. *Psycho-physical problems connected with sensation.* —We can distinguish between the various intensities of sensations, but our discriminations are very vague as long as we rely on introspection alone. The same remark applies to the discrimination of duration. But *indirectly* mental states can be measured with consider-

[1] W. H. R. Rivers in Foster, *Text-book of Physiology*, pt. iv., p. 1356.

[2] See F. W. Edridge Green, *Colour Blindness and Colour Perception*, 2nd ed., 1909; and *Colour Vision and Colour Blindness*, Hunterian Lectures, 1911.

able exactness, by measurement of their physical stimuli. These inquiries form one of the chief branches of that department of experimental psychology which is called psycho-physics; and this term is often used to signify the study of the quantitative aspects of sensation.

The most important and characteristic problem of psycho-physics is to determine the smallest *difference* that can be noticed between two sensations of the same sense; and the relation of this sensation difference to difference in the stimulus. As regards the latter question, there is more than one possibility. Is the sensation difference directly proportional to difference of stimulus?—*i.e.*, does every increase of stimulus above a certain amount produce an increase of sensation, and does it always produce the same amount of sensation; or is the relation more complicated? Every increase of stimulus does not produce an increase of sensation; it may be too small to be noticed. Let us suppose that the sense of hearing is being investigated, as regards its discriminative sensibility, and that the threshold value has been reached. We may increase the sound by ever so little, but the increase may be so small that the mind is unable to perceive it. We must always increase the stimulus by a certain amount if the increase is to be noticed. This gives the "difference threshold" or "least noticeable difference." The eye appreciates a difference of one one-hundredth; sound requires an increase of one-third; the muscular sense of one-seventeenth (Wundt). Different parts of the skin, as we have already remarked, differ very much in discriminative sensibility, as do different parts of the retina.

The determination of the least noticeable difference is not at all a simple matter, when scientific precision is

required, and not merely the satisfaction of curiosity. Extreme care has to be taken to avoid errors, or rather, since they are unavoidable, to make due allowance for them.

One method consists in gradually adding to a given stimulus small amounts which at first cause no perceptible difference in sensation, but at a certain point do cause a difference to emerge in consciousness; or *vice versa* in gradually decreasing the amount of additional stimulus, till the difference originally perceived becomes imperceptible. By taking the average of a number of such results, the minimum may be determined with tolerable accuracy. Another method is known as the method of "correct and incorrect instances." When two stimuli are very nearly equal, the subject will often fail to recognise which is the greater, saying sometimes that A is greater, sometimes that B is greater. When in a large number of trials the right and wrong guesses exactly balance one another, we may conclude that the difference between the two stimuli is not appreciable by the sense. On the other hand, as soon as the number of correct guesses definitely exceeds half of the total number of cases, it may be inferred that there is a certain subjective appreciation of difference. A third method, that of "average errors," is very similar to the one just explained. Here a certain weight (to take a concrete example) is laid upon the hand of the person experimented upon, and he is asked, by the aid of subjective impression alone, to fix upon a second weight exactly equal to the first. It is found that the second weight sometimes slightly exceeds the first, sometimes slightly falls below it. Whether above or below is of no consequence to the method, which

depends solely on the amount of the error. After a number of experiments the different errors are added together, and the result being divided by the number of experiments, gives us the average error which the subject may be calculated upon to make. This marks the amount of stimulus which is just below the difference-threshold for him.

The chief investigation to which these inquiries lead up has still to be explained. Does the difference-threshold represent always the same absolute amount of stimulus, or what is the relation of increase of stimulus to increase of sensation? There are a great many facts which go to show that the same stimulus does not always produce the same amount of sensation. In the night we hear sounds unnoticed in the daytime. The stars are invisible by day. One and the same stimulus will be felt either more or less intensely, or not felt at all, according to circumstances. A stimulus to be felt may be so much the smaller if the already pre-existing stimulation of the organ is small, but must be so much the larger the greater the pre-existing stimulation is. The simplest relation would be if the same stimulus always produced the same effect. The real rule is that the smallest perceptible difference is not absolutely the same but remains *relatively* the same—*i.e.*, it remains the same fraction of the preceding stimulation. The fraction remains constant whatever the absolute value of the stimulus with which we start. Thus, if we could distinguish between two weights of 17 and 18 ounces by lifting them in our hand,—that is, if we could distinguish an increase of one-seventeenth,—we should not be able to distinguish between 34 and 35 ounces; we should require to

add not merely one ounce but the same relative amount—*i.e.*, one-seventeenth or two ounces. The generalisation to which these researches lead was first formulated by E. H. Weber (1795-1878), and its exact numerical statement investigated by G. T. Fechner (1801-87); hence it is known as "Weber's Law" or "Fechner's Law." It may be formulated as follows: "In order that the intensity of a sensation may increase in arithmetical progression, the stimulus must increase in geometrical progression." This law has been explained physiologically, as due to the nature of nervous action, or, on the other hand, as due to general psychological laws; thus, it may be due to the fact that as a nerve is stimulated it gradually loses its sensibility, so that a stronger stimulus is needed in order that any effect may be produced in the cortical centre belonging to that sense; or it may be due, as Wundt thinks, to the general psychological law of relativity, according to which the conscious effect of a psychical state depends upon previous psychical states.

Weber's Law is true only approximately and within certain limits. Experimental verification of it in the case of taste and smell has not been possible: it is not possible to limit the amount of stimulation, and the results are vitiated by the long continuance of the effects. In the case of temperature the results are uncertain. The Law has been approximately determined in the case of hearing, sight, pressure, and the muscular sense, and most accurately in the middle regions of the sensory scale. Towards the upper and lower limits the results become quite uncertain.

Another series of problems arises in connection

th the measurement of duration. The rate at which erve-force is transmitted is known, and hence it is ssible to measure the time taken to perceive a sensan and react on it. Thus if the skin be touched, and e person has to give a sign immediately he feels the uch, the time between the stimulus and the response called "simple reaction-time." It consists of (1) the mulated action of the end-organ and transmission of e stimulation to the centre; (2) a central or mental ocess; (3) stimulation of the motor centre and transission of the stimulus through a motor nerve to the rves of articulation in the hand, with the action of e appropriate muscles. The total reaction-time is ger than the sum of (1) and (3); if, then, we btract these, we get the time occupied by the ntral process, which is proved to occupy an apprecile amount of time, even if it be only a fraction of second.

Yet another series of questions arises out of attempts fix the smallest noticeable sensation (the *minimum sibile*), the "threshold of consciousness," or the iminal intensity" of sensation, in respect of the rious senses. A very small impression, of sound, for stance, is taken, so small that it is not perceived at all, d gradually increased until it is heard; in this way the reshold value is found; or a loud sound is taken and adually decreased. Such experiments give at least an proximate measure of the "absolute sensibility" of e sense which is being investigated.

See Myers, *Text-book of Experimental Psychology* (3rd .), vol. i., ch. xviii. ("Sensory Acuity") and xix. ("Weber's w and Related Facts") and the corresponding portion of l. ii. ("Experimental Work"); and James, *Principles*,

vol. i. pp. 533ff. ("Weber's Law"), and pp. 85ff. ("Reaction Time"). An early essay by James Ward, "Fechner's Law," in *Mind*, O.S., vol. i. pp. 452ff., will repay study. The main points of an important Essay by Meinong, *Ueber die Bedeutung das Weberschen Gesetzes*, are summarised by Professor Stout, *Manual*, bk. ii., ch. viii. The minuteness with which quantitative methods have been developed will be seen in Titchener, *Text-book of Experimental Psychology*, vol. ii. ("Quantitative Experiments").

§ 10. *Are our sensations reducible?*—This question means, is the variety of qualitative differences among our present senses reducible to some one fundamental form of stimulation? In ancient times Democritus suggested that the senses — organic and muscular sensations being excluded—were all reducible to *touch*, because they all depended upon contact with the organ; not always the contact of the perceived body or particles of it, but at least of a medium which is itself set in motion. In modern thought we should set the question in another way: instead of asking which is the most fundamental of our present senses, we should ask, in accordance with the accepted ideas of development and evolution, what kind of sense may we assume to be primitive—*i.e.*, to have developed first in the evolutionary order of living beings? We may assume that in the case of the lowest animals something which, by an imperfect analogy, we may call a "sense of touch" was the first to differentiate itself from the general vital feeling which must have been the most primitive form of conscious life. Pressure and temperature were in all probability the first senses. When movable appendages have developed, such as the feelers of insects or the cilia of marine animals, we have the possibilty of

a finer sense of touch. Certain points on the surface would then become differentiated to appreciate taste and smell. At a later stage the first beginnings of the organs of hearing and sight would appear. The Comparative Anatomy of the sense-organs shows that these suggestions are far from being mere speculations. Thus certain *spots in the skin* of some of the lowest animals seem to be the rudimentary organs of vision, for they are sensitive to light. In creatures of a slightly more complicated organisation these spots are beneath the surface, with which they communicate by a nerve-process.

This view of the development of the special senses out of a more primitive state of consciousness, harmonises with the true conception of mental development. We have remarked that the earlier English psychologists were in the habit of speaking as if consciousness began with simple or distinct "ideas" or sensations, like discrete atoms, and as if the further progress of consciousness consisted in building up these atoms into more complicated structures. This view influenced psychology for a long time, and played a great part in English philosophy. It is not a true view of the progress of the mind. The starting-point of consciousness should rather be compared to a vague mass of sensation. The nearest approach to such a state is in our feeling of the bodily organism. If we were limited to pure organic sensation without any definite pleasures or pains, this vague mass would represent the starting-point of consciousness.

It follows that the sensations which we have been speaking of in the present chapter are not primitive facts of mind. They are developed facts of mind, and the experience of them involves the mental activity of

discrimination, the discernment of differences in consciousness. They are elementary forms of Perception.[1]

It must be carefully borne in mind that physiological complexity is no proof of psychological complexity; for the psychologist those qualities are simple or ultimate which we cannot further consciously subdivide, even with the help of a previous experience of the sensations which are known to correspond to a separate production of certain constituents of the whole nerve-process involved.

§ 11. *Feelings aroused by special sensations.*—We have seen that any sensation, of the class which we have been describing in this chapter, normally follows upon the stimulation of a sensory nerve, when the excitation is conveyed to the brain,—an "afferent" nerve-current. It is also known that every such afferent stimulus tends, on reaching the nerve-centre (in this case some area of the cortex), to discharge an *efferent* nerve-current through a motor nerve, which tends to result in movement. This motor reaction makes a contribution to the state of consciousness involved in the sensation. In addition to this, there is a further "diffusion of effects"; for while a stimulus to the nerves of a special sense, hearing, for instance, arouses an appropriate sensation, it has a diffused nervous effect, which may be very intense, as when a noise "sets the teeth on edge." Further, there is a constant action and reaction between the central nervous system and the general organic conditions of the body. The former may affect the latter directly, and thus add organic sensations to the original special sensation; and again the organic conditions affect the central nervous system not only through sensory nerves connecting the internal

[1] For a forcible statement and explanation of this view, and a discussion of the outstanding facts involved, see Ward, *Psychological Principles*, ch. v.

organs with it but by other means, such as variation in the blood-supply: this further complicates the organic sensations.

Thus there are three factors, on the physiological side, in the production of a sense-feeling:—

(*a*) the stimulus of the special sense-organ,

(*b*) the diffused nervous excitation (including the motor tendencies aroused),

(*c*) the accompanying organic complications.

This means that (*b*) and (*c*) add to the special sensation an escort—so to speak—of organic sensations. Now (*b*) and (*c*), as well as the sensation aroused by (*a*), have affective qualities of their own. We do not say that the affective qualities belonging to (*b*) and (*c*) are usually—or even often—intense. On the contrary, they often escape notice altogether; but they are present, and lend to the particular experience a character which it would not have if they were absent.

We will now give a few concrete illustrations of these somewhat abstract statements. The diffused bodily excitement by no means always escapes notice; Professor Ladd and Professor G. F. Stout have laid stress on its effect in adding a special character to the affective tone of sensations. It may be seen even in the case of sensations which have *little affective tone of their own*. These writers refer, for instance, to the highly disagreeable character of the "distraction" caused by being spoken to in a whisper, or lightly touched, when one is listening to a series of sounds, or looking intently at some object. The displeasure is not aroused by the whisper or touch *itself*, but by the diffused bodily and mental excitement connected with it. The same is true of the strong pleasure (or displeasure) produced by stroking, tickling, or rubbing. When *the affective tone*

of a sensation is strong, the diffused effects may also be noticed. A bitter taste, or a piercing railway whistle, may be unpleasant enough in itself, but these other accompaniments may make it horrible. A sweet taste may be intensified by the same cause; or, again, though pleasant in itself, may become "on the whole" nauseous through the diffused effects aroused. When these effects are much less noticeable in themselves, they appear as *different qualities of the various pleasures and pains.* "The pleasure of a sweet taste," says Professor Stout, "differs in kind from that of a bright colour or a musical note; and the difference cannot be wholly identified with the qualitative diversity of the sensations of sight, taste, and hearing themselves." But even in pleasures and pains of the same sense, these differences exist. *The way we feel* is not by any means always the same for all equally pleasurable or equally painful sensations of the same sense. "Some agreeable sweet odours," says Professor Ladd, "are described as 'heavy,' others as having an enlivening or 'spicy' quality. . . . Pleasant coolness is 'refreshing'; pleasant warmth is 'cherishing.' . . Musicians have always attached different distinct kinds of feeling to different musical instruments, and to different keys and chords. . . Bright light and mellow light produce differences in the character of the equally pleasurable feeling which may result."[1] It seems clear that these differences cannot be identified with the difference between pleasantness or unpleasantness, or between various intensities of these; nor can the affective differences, in the proper sense of the word, be reduced to these other differences of nervous and organic origin.

It is, however, in the case of impressions of sight and sound that the "escort of organic feelings," which always

[1] *Psychology, Descriptive and Explanatory*, pp. 184, 185.

accompanies them, is usually so faint as to be neglected, in practice, as compared with the sensation itself and the feelings and interests dependent on it. But it is most important that they should be distinguished; and in certain cases we cannot ignore them even practically. Suppose the sense-organ—through over-use or for some constitutional reason—is in a strained or unhealthy condition; then we are aware on the one hand of the feelings accompanying the working of the organ, and on the other hand of the feeling belonging to the special sensation. Thus, I may be pleased with a colour, while at the same time I experience some feeling of discomfort in connection with my organs of sight. If we further suppose the organ to be structurally injured,—if, to take the instance which most readily occurs, we suppose the external stimulus to be so intense as to have this effect,—then the organic feelings may be so intense as to draw to themselves the whole energy of consciousness in the effort physically to get rid of the stimulus.

What we must insist upon is this: the affection aroused by the special sensation itself is a real mental fact, and is not to be identified with, or explained away through, the processes marked (*b*) and (*c*) in the foregoing paragraph.

§ 12. *Conditions of the affective quality of sensation.*—The pleasurable or painful character of a sensation depends (*a*) on its quality, (*b*) on its intensity, (*c*) on its duration.

(i) The quality of a sensation is its most fundamental attribute, and makes the sensation what it is; quality is what distinguishes "blue" from "red," "sweet" from "bitter," "warm" from "cold." The other attributes depend on this one. Sensations which differ in quality are different sensations; a sensation may

generally change in intensity or duration without becoming a qualitatively different sensation. Unfortunately any statements we can make as to the dependence of affection on the quality of sensation are only true "on the whole" or "as a rule." It is not certain that there is any *quality* which is absolutely and always pleasant (or unpleasant). This is because the affective tone of a sensation depends also on its intensity. All we can say is that, apart from all personal variations, certain qualities are distinctly preferred to others. The student should be able to examine this for himself,—comparing, for instance, low (musical) tones with high ones, one colour with another by daylight (blue, green, red, yellow), sweet tastes with bitter, warm cutaneous sensations with cold ones, smooth or blunt touches with rough or sharp ones. He should remember that what he is considering is the affective tone of sensation in itself, neglecting as far as possible other factors in the context of mental experience in which it occurs.

(ii) We may say also that no single *intensity* is absolutely and always pleasant (or unpleasant), for quality enters in; but, quality remaining the same, affection does vary, and may vary greatly, with intensity. A sensation must have a certain minimum of intensity before it can arouse any affective tone at all. This may be called the affective threshold or *limen*.[1] If it then begins to be felt as pleasant, its pleasantness increases in intensity up to a certain point, where it remains constant for a while, and then more or less quickly becomes unpleasant. The following is an illustration. Hold your finger in water whose temperature gradually rises from 35° to

[1] On the conception of a threshold of consciousness, see above. § 9.

50° centigrade during the space of two minutes and twenty seconds: you feel at first an agreeable warmth, then some slight, unpleasant prickings, then oscillations of intense prickings with moments of rest, and lastly, pain.[1] As we have already observed, continual increase of intensity injures the sense-organ, and the experience becomes purely "organic." If, on the other hand, the sensation begins to be felt as unpleasant, its unpleasantness increases with increase of intensity. The student should verify this result for himself, so far as possible, bearing in mind the caution given at the end of the previous paragraph.

Some writers have supposed that the transition from pleasant to unpleasant sensation must take place through a neutral state which is neither,—the "zero" of the affective scale. This theoretical assumption has never been definitely verified in experience; and Lehmann has found that the transition from pleasure to pain, in some cases at least, does *not* take place through a neutral state.

(iii) In the case of duration,—quality and intensity being supposed not to change,—similar results are obtainable with a sensation which begins to be felt as pleasant; its pleasantness increases in intensity up to a certain point, where it remains constant for a while, and then more or less quickly becomes unpleasant. But if a sensation begins by being felt as unpleasant, its unpleasantness increases up to a certain point, at which it may remain for a long time; afterwards its unpleasantness may decrease. The same conclusions apply when the sensation is not continuous but is repeated intermittently. In such cases it is a matter of common experience that a sensation originally un-

[1] This result was obtained by Lehmann.

pleasant may lose its unpleasant character by repetition, as when "custom blunts feeling." Professor Ward speaks of chemists sorting the most filthy mixtures by smell and taste without discomfort. There is also the possibility that a sensation originally unpleasant (more or less) may at length become pleasant, as in the case of "acquired tastes."

The study of sense-feelings should be pursued in Külpe, *Outlines* (Eng. tr.), 3rd. ed., §§ 37-41. The reader of German should on no account neglect Lehmann, *Hauptgesetze des Menschlichen Gefuhlslebens*. The outstanding facts are summarised in Stout, *Manual*, bk. ii., ch. viii. (Höffding's earlier statement, *Outlines*, pp. 221-232, should be compared). See also Myers, *Experimental Psychology*, vol. i., ch. xxiv., and Titchener, same title, vol. i., ch. vii.

In a book like Ribot's *Psychology of the Emotions*, where the greatest stress is laid on the bodily or organic side of feeling, the direct dependence of affective tone on sensation is scarcely discussed. It is carefully examined by Lehmann, pp. 172-196, and by Külpe, *loc. cit.* (Eng. tr., pp. 225-230, 247-250). In the former of these passages Külpe well shows that the affective tone is not a *mere* attribute or a *mere* function of the sensation. It is a physical process of a new kind, supervening on the sensation and aroused by it.

CHAPTER X.

THE GENERAL CONDITIONS OF PLEASURE AND PAIN.

§ 1. *Meaning of problem.*—We have now to generalise the question discussed in the concluding sections of our previous chapter. The contrast between pleasurable and painful feeling is—broadly speaking—so marked that we are naturally led to inquire whether there is any corresponding contrast in the attendant circumstances of these two kinds of feeling. Is there any characteristic condition always present when pleasant feeling arises and absent when painful feeling arises; and any contrasted characteristic condition always present when painful feeling arises, and absent when pleasant feeling arises?

Most psychologists say *yes*. There are various theories on the subject, which may be grouped as follows:—

(*a*) Psychological theories, which seek to assign a general law for pleasure and pain, in terms of consciousness alone.

(*b*) Genetic or biological theories, which attempt to show the origin and evolutionary significance of pleasure and pain and the corresponding internal states.

(*c*) Psycho-physical theories, which attempt to state a general law for pleasure and pain in terms of the action of the central nervous system.

Usually the attempt is made, by upholders of one or other of these theories, to make it cover the whole field of the affective life,—to prove its applicability to every level of mental growth. This does not seem to be possible with any theory at present in the field.

§ 2. *Pleasure-pain and activity.*—One of the fundamental principles in the psychological position worked out in this book is, that the mind is essentially active in being conscious of an object (of any kind).[1] Conscious life is never without activity, occupation, exercise: "conscious energy is conscious life"; this is true throughout, even at the low levels where there is no consciousness of end or purpose.[2] Above these levels, any conscious activity is a tendency towards some end of which we are conscious,—"some positive result ideally represented before its achievement." On the achievement of the result, this particular conation completes itself and has nothing further to accomplish; as a distinct conative process, it ceases. It has been well said that "if a conative process is allowed to develop freely without interruption or repression, it tends to go on until a certain result is attained, and when the result is attained it ceases of itself." This result is a mental state, and may be called the *end-state;* it accompanies but is not the same as the achievement of the *end* or consciously represented purpose of the conation. The *latter* is the form in which the end appears to the agent before its attainment; the *former* is the mental state which arises when it is completely attained.

It is in immediate connection with these conscious tendencies that pleasure or pain arises. No pleasure

[1] Ch. iv., § 7; ch. vii., § 12.
[2] Ch. vii., §§ 1, 3.

or pain arises except as accompanying some active tendency.

Can we, then, arrive at any general statement of the connection between pleasure or pain and conation?

(i) The most obvious answer to this question lies in the fact, implied in the expressions (regarding feeling) current in common language, and referred to above (ch. iv., p. 89), that activity is "feeling-prompted." Some change takes place in our surroundings, we are pleased or pained by the change, and we act accordingly. The general fact is very well put in a passage from one of the earlier modern writers on psychology quoted by Hamilton.[1] "A person is fond of cards. In a company where he sees a game in progress, there arises a desire to join in it. Now the desire is here manifestly kindled by the pleasure which the person had and has in the play. The feeling thus connects the cognition of the play with the desire to join in it; it forms the bridge and contains the motive by which we are roused from mere *knowledge to conation*, by reference to which we move ourselves so as to attain the end in view. Thus we find, in actual life, feeling intermediate between cognition and conation. . . . Without some kind or another of feeling towards an object, there could be no tendency of the mind to attain this object as an end; and we could therefore determine ourselves to no overt action. The mere cognition leaves us cold and unexcited; the awakened feeling infuses warmth and life into us and our action; it supplies action with an interest, and, without an interest, there is for us no voluntary action possible. Without the intervention of feeling, the cognition stands divorced from the conation,

[1] Biunde, *Versuch d. empirischen Psychologie* (1831); quoted by Hamilton, *Lects. on Metaphysics*, vol. ii. pp. 425-427.

and apart from feeling, all conscious endeavour after anything would be altogether incomprehensible." Hence —as it has been otherwise expressed—"the dynamic efficacy of ideas is entirely excited through the feeling subject; . . . it is the subject who acts upon his appreciation of the stimulus, and the emotional attitude of welcome or repulse is what is meant by feeling."[1]

There seems thus to be a relation of dependence at least in this way—that *if activity is to take place, feeling must be there.* In this sense, activity depends on feeling.

(ii) This suggests the question, Is the dependence mutual—*i.e.*, does the feeling depend on the activity? This question, as we said above, must take the form: Is there any broad dividing line possible, in the character of active mental occupation with objects, corresponding to the broad dividing line between pleasant and unpleasant qualities of feeling? Can we say that when pleasure arises, it is the concomitant of mental activity of a certain kind, and when pain arises, it is the concomitant of mental activity of another kind? The answer which is proposed is as follows. The more easily an active tendency passes to its *end-state*, the more pleasant it is; the more an active tendency is obstructed (the more it is repressed, or carried on under difficulties; or deprived of sufficient exercise, as in cases of "monotony"), the more unpleasant it is. The same thing may be otherwise expressed when we regard a conative tendency as the progressive achievement of an *end:* the end in view is never absolutely simple—it has different aspects or elements;

[1] See essay on "The 'New' Psychology and Automatism," in Professor A. S. Pringle-Pattison's volume, *Man's Place in the Cosmos*, 2nd ed., p. 73.

and when these further one another, play the same game, so to speak, and so facilitate conation, we have pleasure; when the contrary, conation is thwarted, and we have pain.[1] A good illustration has been given by Professor Stout. "The type of the painful state is *Tantalus*, continually reaching after the fruit which continually evaded him. All pain consists in being somehow *tantalised*,—in having a mental tendency at once stimulated and obstructed. The counterpart on the side of pleasure to the state of Tantalus is not, however, that of immediate and complete attainment; it is the smooth and prosperous progress towards attainment."[2] With final attainment of the end, this particular tendency ceases to operate, and the pleasure ceases also.

Thus the dependence of feeling and conation is mutual. Neither of them can vary in complete independence of the other; and neither of them is a mere dependent product of the other.

Referring to the connection of the positions laid down in paragraphs (i) and (ii) respectively (viz., on the one hand, that activity is feeling-prompted, and on the other hand, that the pleasant or unpleasant quality of the feeling depends on the nature of the activity), Professor Stout observes (*Manual*, bk. ii., ch. viii., § 6, p. 328): "If it is supposed that, first, pleasure exists, and that, subsequently to its occurrence, the conative tendency arises as a consequence, it is a logical circle to explain the pleasure by reference to the conation. But, as a matter of fact, there seems to be no reason whatever for supposing that feeling-

[1] Even in the case of what appear to be passively pleasant sensations (cf. ch. vi., § 9, p. 138) this will hold good; for there is at least an unconscious tendency to continue such an experience until we have had enough of it.

[2] *Analytic Psychology*, vol. ii. p. 270.

tone and conation are separated in time. From the very beginning they appear to coincide; from the very beginning a pleasing process is a process which tends to maintain itself." This passage suggests the following remarks. (1) To conceive of activity as feeling-prompted does not require us to assume that the feeling and the activity are "separated in time"; it only requires us to assume that the activity is not identical with the feeling, and that *if* the activity is to arise, the feeling must be there. (2) To say, without qualification, that "they [feeling-tone and conation] appear to *coincide*," that (*e.g.*) "a pleasing process *is* a process which tends to maintain itself," is surely to identify the two. Or if not, it is so far to identify them that we cannot assert the dependence of pleasure-pain on conation in the sense in which Professor Stout himself asserts it (as in paragraph (ii) above); for if we are prevented from asserting the dependence of activity on feeling, because this implies priority in time, we are for a similar reason prevented from asserting the dependence of feeling on activity. (3) It is inadmissible even to speak of the possibility of "explaining" pleasure-pain by reference to conation (or the reverse). We must lay down as a primary and fundamental principle that conation, feeling, cognition, are of equal importance for the interpretation of consciousness; consciousness cannot be interpreted in terms of one of these unless the others are made of equal importance with that one. Hence not one of the three factors (feeling, for instance) can be regarded as merely derivative from another (conation, or cognition). Cf. Mellone, *Philosophical Criticism and Construction*, Preface, pp. ix-xii. Thus there can be no logical circle in holding both the positions (i) and (ii), for neither of them is an "explanation," and together they only assert the interdependence of two factors, which yet are not so completely dependent on each other as to enable us simply to infer from the variations of one of them what the variations of the other will be.

If, on the other hand, when Professor Stout speaks of "explaining the pleasure by reference to the conation," he does not mean that his theory derives the pleasure from the conation or seeks to give the origin of the feeling, or that we

have "explained" the pleasure by reference to the conation when we can say that all conations of a certain kind are attended by pleasure: then Professor Stout's position does not differ from the one taken up in this book.

§ 3. *Pleasure, pain, and desire.*—The position that "whatever conditions further and favour conation in the attainment of its end, yield pleasure, and whatever conditions obstruct conation in the attainment of its end, are sources of displeasure," is illustrated by the most familiar experiences of daily life. It may be verified in every case of *desire* (ch. v., § 9).

Desire, as we have seen, involves the presence of an *unrealised idea*, the end or purpose, the object desired; desire leads to action for its realisation, involving the mental process of conation; when the object is achieved, this particular conation ceases. Applying our principle to desire, we may say that desire is pleasant in proportion as action for its realisation goes on without being hindered by anything extraneous to itself; and that desire is painful in proportion as action for the attainment of the desired end is obstructed.

We shall use as an illustration the following passage from Bain.[1] "The inmate of a small gloomy chamber conceives to himself the pleasure of light and of an expanded prospect; the unsatisfying ideal urges the appropriate action for gaining the reality; he gets up and walks out. Suppose now that the same ideal delight comes into the mind of a prisoner. Unable to fulfil the prompting, he remains under the solicitation of the motive; and his state is denominated craving, longing, desire. If all motive impulses could be at once followed up, desire would have no place; . . .

[1] *Emotions and Will*, ch. viii.

there is a bar in the way of acting which leads to the state of *conflict*, and renders desire a more or less painful frame of mind." This use of the term *desire* is certainly too narrow, in limiting it to *frustrated desires*; but, allowing for this, it illustrates our point: so far as there is a bar in the way of acting, desire is painful.

This is impressively illustrated in the case of a complex desire embracing various subordinate desires, as in the working out of a comprehensive plan. Suppose the prisoner conceives a plan of escape, involving collaboration with an accomplice outside, filing through bars, crossing walls, disguising himself, &c. The *ultimate* end, freedom, is the unrealised idea on which the whole series of activities depends; but, though this final purpose may only occasionally appear in full consciousness amid the series of subordinate desires, the feeling-tone of the whole is pleasant and satisfactory so far as these desires (1) are in themselves successful and (2) work together harmoniously to realise the ultimate end.

It is sometimes remarked that desires which are specially prominent or intense in consciousness are to some extent painful. This is only true so far as the prominence of the desire means that it is itself unsatisfied and has a disturbing influence on other conations. On the other hand, a keen desire for the attainment of an end in view, both in sport and in the business of life, is indispensable for real enjoyment of the labour required for attaining it—provided that the labour, though considerable, is gradually successful.

§ 4. *Feeling-tone of intellectual activities.*—It is in connection with the processes of the intellect, and with the experience of the "beautiful" and the "ugly," that the theory of feeling, outlined above, can be most easily and

completely verified. No detailed reference was made to these types of feeling in our preceding chapter, since they are most conveniently discussed here. We take first the feelings attendant on the operations of the intellect, directed to the ascertainment of fact and truth,—in a word, knowledge.

Knowledge may be valued from more than one point of view. The mass of mankind value it chiefly, or entirely, on account of its *immediate* practical bearings. People want to *know* only because they have something definite which they want to *do;* the knowledge is a means to something else. This utilitarian view of knowledge has its rightful place, and it lies at the bottom of a great deal of the interest in discovery and invention which is so marked a characteristic of the present age. But other valuations of knowledge also have their rightful place. It is impossible to deny the existence of an intrinsic interest in seeking for a cleaner, clearer, more inclusive mental view of things,—a theoretic curiosity, a theoretic need, often described as a desire for knowledge "for its own sake."

This last phrase leads to much misunderstanding. Nobody supposes that the mere possession of "truth" as a passive state, the mere representation inside us of what is outside us, has some mystic value on its own account. What is valued is the active-emotional direction of the mind to one end—of *so thinking* that our thought may harmonise intellectually with the fundamental structure of things. There have been very many scientific discoveries—which *after discovery* have proved of immense benefit to human life all round, but were in this sense useless at the time of discovery—which would never have been made, if the desire to know were not a real part of our nature: the "desire to know" for

the sake of nothing beyond the essential intellectual-emotional activities involved in the realisation of the knowledge. Scientific discoveries are all "useful"; but sometimes their usefulness for the service of life and conduct is not an immediate but a remote consequence:[1] they are "useful" *in the first place* because man is rational and therefore desires them: he seeks them, we repeat, for the sake of nothing beyond their active realisation by the seeker.

It is in connection with this instinctive tendency—the search for or desire for knowledge, as an active impulse—that the intellectual feeling, in the proper sense of the term, arises. It must be distinguished from "surprise" (at what previous custom makes unexpected) and from the more prolonged state called (in ordinary language) "wonder," which implies a more settled interest in something novel. There is no single word, in English,[2] which provides a satisfactory name for the theoretic impulse, as such; "curiosity" and "wonder" are both unsuitable. Martineau adopted the latter term. "That *Wonder* is the primitive intellectual impulse, whence all philosophy springs, is a maxim held in common by Plato and Aristotle; drily stated by the latter;[3] embodied by the former in the graceful saying that 'it is a happy genealogy which makes *Iris* the daughter of *Thaumas*'[4]—*i.e.*, which treats the messenger of the gods, the winged thought that passes to and fro between heaven and earth, and brings them into communion, as the child of Wonder."[5] The same writer

[1] An impressive instance of this is seen in the whole field of investigation opened up by the discovery of radium and radio-active substances (1907; cp. present knowledge, 1926).

[2] German, *Wissbegier*.

[3] *Metaphysics*, bk. i., § 2.

[4] *Theætetus*, p. 155.

[5] *Types of Ethical Theory*, 2nd ed., vol. ii. p. 152.

quotes, from Professor Lewis Campbell's interesting life of the late James Clerk-Maxwell, one more out of the innumerable examples of this characteristic of the genuinely scientific mind: "Throughout his childhood his constant question was, 'What's *the go of that?* what does it do?' Nor was he content with a vague answer, but would reiterate, 'But what's the *particular* go of it?' . . . I distinctly remember his telling me, during his early manhood, that his first recollection was that of lying on the grass before his father's house, and looking at the sun, and *wondering*."

It is sometimes said that the operations of the intellect are "cold and passionless," or at most attended by "quiet feeling." Very often the feeling is "quiet"; but just as often the carrying on of purely intellectual work—as in thinking out a problem—gives rise to a high degree of excitement, which is just the emotion spoken of above (§ 3, *ad finem*),—the emotion of *energetic pursuit gradually successful against difficulties.* When Sir Isaac Newton started a calculation to test his hypothesis as to the Law of Gravitation,[1] and after proceeding a little way with it, perceived that it was likely to end in verifying the hypothesis, he was utterly unable to carry on the calculation, from the overpowering excitement of its anticipated termination; and he requested a friend to finish it for him.

In children the desire to know takes the form of a wondering curiosity about all kinds of things. This curiosity has been accounted a human instinct (see above, ch. vii., § 3). Children's questions are of many kinds,—judged from the adult point of view, some are profound, others meaningless, some of practical import-

[1] That any two bodies attract each other with a force varying inversely as the square of the distance between them.

ance, others senseless or having no relevance to the case (as when a little boy takes a picture of a railway-train to his father and asks "where the train is going to," and is grievously disappointed because he can get no answer). In after years custom blunts the freshness of the child's curiosity; the mind settles down to take certain things as a matter of course, and ceases to inquire concerning what is customary. And then *surprise* at something novel or unexpected happening, is an indispensable preliminary to the desire to know. That anything, by mere repetition, can cease to need explanation, is of course a pure illusion. "True," says Carlyle, "it is by this means we live, for man must work as well as wonder: and herein is custom so far a kind nurse, guiding him to his true benefit. But she is a fond foolish nurse, or rather we are false foolish nurselings, when in our resting and reflecting hours we prolong the same deception."[1] The desire to know, and the capacity to find satisfaction in knowing, in the harmony of our thought with reality, are ultimate facts, behind which we cannot go.

The pains and pleasures of intellectual operations, whether these are directed to the end of knowledge "for its own sake" or for some practical purpose, can all be brought under the general theory which we have had in view (§ 2, ii). The pains of intellect are all cases of thwarted endeavour. The following are obvious and yet quite typical examples. We try to recollect something, under difficulties, or in vain. We fail to understand or follow a proof—as in arithmetic or mathematics—or we unsuccessfully attempt to solve a problem. We try to work out some speculative view which only ends in puzzles. We find ourselves being led to con-

[1] *Sartor Resartus*, bk. iii., ch. viii. ("Natural Supernaturalism").

flicting results. We are drawn in different directions at once ("distraction")—as when a general at a critical juncture in war is undecided as to his course; or when a person receives contradictory advice as to the treatment of an illness. An event which is so strange or novel as to be outside the circle of ordinary events and in conflict with ordinary experience gives rise to an emotion (see ch. ix., § 9) whose painful character partly arises from the impossibility of intellectually adjusting the new experience to the old. All these instances show that an intellectual process is attended with unpleasant feeling so far as it leads to distraction, conflict, or contradiction.

The extent to which the mind is capable of feeling the pain of contradiction depends on the degree of its intellectual cultivation. We said that the mass of mankind value knowledge chiefly by its immediate practical bearings; and when these are interfered with by contradiction or inconsistency in the intellectual process, most people have a keen appreciation of the state of affairs. But when the mind is sufficiently cultivated to appreciate *all* the bearings of true knowledge (even those which are not immediate but remote,—and some of its greatest practical consequences may be remote), then the thinker begins to feel contradictions and difficulties to which the multitude are indifferent.

The pleasures of intellect arise from the reverse conditions to those above mentioned. They may be included under one general description. Intellectual pleasure, properly so called, arises from harmonising facts which were separate or discordant before,—harmonising them by finding in them resemblances such that we may embrace them all under one idea or statement: this means an increase in the number of facts

that can be comprehended by one intellectual effort, and therefore an economy and facilitation of effort. This satisfaction is greatly added to by contrast, as a relief from a previous state of intellectual indecision or inconsistency.

§ 5. *Feeling-tone of the æsthetic consciousness.*—The æsthetic emotions are those aroused by Beauty and its opposite, and by the Sublime and the Ludicrous.

Our account of these will be simplified if we re-state the theory of pleasure and pain which we have been illustrating. We stated it in terms of *tendency towards an end;* we now state it in terms of *attention*—in this, following Professor Ward.[1] "There is pleasure according as a maximum of attention is effectively exercised, and pain in proportion as such effective attention is frustrated by distractions, shocks, or incomplete and faulty adaptations,—or fails of exercise owing to the narrowness of the field of consciousness and the slowness and smallness of the changes."

We have already pointed out that attention is simply conation (mental activity) carried on under a certain condition—viz., to attain to a fuller presentation of the object without seeking to alter it into something else. To a certain extent, therefore, our "re-statement" of the theory has limited it, since the process of "tendency towards an end" is wider in meaning than that of "more fully apprehending an object."

Æsthetic feelings appear in their characteristic qualities in connection with the products of the Fine Arts. It is agreed on all hands that these feelings may be distinguished as follows:—

(i) They do not depend on any ulterior purpose—such as utility or knowledge—served by the object

[1] *Psychological Principles*, ch. x., § 2.

which arouses them. Satisfaction in Beauty is sought "for its own sake." The interest is felt for the object *in itself*, and not in its relation to the self. The attitude of mind is contemplative—*i.e.*, the attention is outwardly directed, and there is no implication of an unrealised end. In intellectual observation, on the other hand, we have attention actively directed and seeking.

(ii) They have no disagreeable accompaniments (as sensual pleasures have). Hence their susceptibility to prolongation. Fatigue or strain are accidental so far as the proper art effect is concerned.

(iii) Their enjoyment is not limited to one or a few persons, but can be shared by all who have the capacity for appreciation. This consideration is very important, and of itself goes far to fix the limits of what can be called Beauty. To begin with, it limits the objects of æsthetic enjoyment to the two higher senses, sight and hearing.

There are many kinds of experience which in themselves do not belong to art, but can be brought into art by being represented in idea; these include many of our muscular and bodily feelings. Bain has very well illustrated this, showing how the principle that the pleasures of art are such as can be collectively shared assists us in drawing the line. "A painter or a poet may depict a feast, and the picture may be viewed with pleasure. The disqualifying circumstances are not present in ideal delights. So wealth, power, dignity, affection, as seen or imagined in others, are not exclusive. In fact, mankind derive much real pleasure from sympathising with these objects. They constitute much of the interest of surrounding life and of the historical past; and they are freely adopted into the compositions of the artist. It

may be objected here that to permit, without reserve, the ideal presentation of sensual delights, merely because of its being a diffused and not a monopolised pleasure, is to give to art an unbounded licence of grossness. The reply is, that the subjects of Fine Art are limited by considerations that are very various in different countries and times, and are hardly reducible to any rule. The portraying of sensual pleasures is objected to on moral and prudential grounds, as over-stimulating men to pursue the reality; but there is no fixed line universally agreed upon. It is evidently within the *spirit* of Fine Art, as implied by the conditions above given, to cultivate directly and indirectly the sources of pleasure that *all can share in*, that provoke sympathy instead of rivalry. Hence [scenes and] tales that inflame either the ambition or the sensuality of the human mind, in their consequences, inspire what are called the *baser* passions, properly definable as the passions implying rivalry and hostility because their objects are such as the few enjoy, to the exclusion of the many."[1]

There has been a controversy as to whether *simple sensations* of sight and sound can be considered to afford æsthetic pleasure. This is not a point of much importance; for no one would deny that the characteristic experience of the beautiful begins with the combination of sensations into some kind of whole. Hence an art-product has been said to involve always a *unity in variety*. We may express the same thing by saying that the different elements in the combination must form a *harmony*. "A variety of elements," says Professor Ward, "be they movements, forms, colours, or incidents, instead of conflicting, all unite to further each other, and form not merely a mass but a whole." How, then, is

[1] *Mental and Moral Science*, p. 291.

the whole or harmony constituted? The answer is, that an art-product affects us with the characteristic feeling for beauty when it is at once *a harmony of matter, form, and suggestion.* No exclusive stress can be laid on any one of these factors in contrast with the others; each of them contributes something essential to the complete experience of the beautiful.

(*a*) *Material conditions.*—These are always of the nature of perception, and have, therefore, a basis of sensation. Different arts—music, painting, sculpture, architecture—appeal to the two senses in different ways, and each has its own characteristic manner of weaving the sense-material into the artistic effect.

(*b*) *Formal conditions.*—These will be found to be such that, in cases of artistic pleasure, *attention* is facilitated, readily and economically accommodated; in the contrary cases, it is surprised or obstructed. The reader will be able to verify this in detail. We give a few illustrations of it in connection with the simpler æsthetic experiences. In a harmonious combination of musical notes, the coincidences in the vibratory periods of the sounding bodies are more frequent, the more perfect the concord: thus, in the octave (the most perfect concord) there is a coincidence at every other vibration, since the string sounding the higher note vibrates twice as fast as that sounding the lower note. The more numerous these coincidences, the easier it is for attention to apprehend the two notes as one sound. There are similar coincidences of the overtones (ch. ix., § 7) in the case of the musical concords. In a harmonious combination of colours, each is a retinal "rest" from the other. When, again, we take into account the *intensities* of the sense-elements, we find attention facilitated by the regularity of rhythmic suc-

cession, and the gradual increase or decrease of sound; or correspondingly in the case of sight, by gradual variations of colour (as in the rose) and curved or symmetrical outlines.

These harmonies of form unquestionably contain an important part of the conditions of pleasure in beauty; but they cannot be made the *only* essential factor. The late Edmund Gurney, in his wonderfully suggestive book, *The Power of Sound*, has shown that the artistic effect of an object may vary out of all proportion to any variation of its formal characteristics. It is possible to have a melody of exquisite beauty, and another which is dull and commonplace, with no difference of form between them that can be compared to the difference in effect. The same may be said of the effect of a succession of notes sung by a voice like that of Jenny Lind or Patti and by an average singer. There are evidently variations and intensities of æsthetic feeling whose sources elude our analysis at present.

Attention is facilitated by another formal factor in artistic effect: the effect is pleasing according as it is obtained with little effort and by simple means. This is most easily illustrated in poetry and rhetoric. The charm of Tennyson, as compared with a good deal of Browning's writings, is *in part* accounted for by the simplicity of the means taken to secure the effect. Considerations of this kind led Herbert Spencer to lay down the general maxim that, in composition and rhetoric, "economy of the recipient's attention is the secret of effect."[1]

(*c*) *Associative suggestion.*—The more our knowledge and experience grow, the greater becomes the suggestiveness of the most ordinary sense-experiences. They may

[1] *Essays* (last ed.), vol. ii., ch. ix.

in themselves be of no moment, but what they remind us of lends them their significance and meaning. This is none the less true if the past experiences, which are thus revived, appear only in the form of vague ideas, tinged with feelings similar to those which they originally aroused. The pleasantness of the monotonous call of the cuckoo is due to its intimate association with all that spring-time means. The delicate and fragile maidenhair fern, the curved vale, the Alpine crag, awaken a multitude of associations, indefinite in form, but none the less operative in the effect. The artist avails himself of such associations to the utmost. They are, indeed, not equally prominent in all cases, either in nature or in art. The beauty of a flowering plant is mainly one of perceived form and colour, while the pathos of a crumbling cottage, or the sombre sublimity of a Norwegian fjord, are nearly all a matter of the creative imagination of the observer. In certain forms of drawing, the effects of suggestion are vital to the result. Thus, to take a very simple case, when an artist sketches a tree in full leaf, he never gives an exact representation even of the outline of each detail in the real object (to do so, were it possible, would ruin the whole effect); he arranges a multitude of little wavy lines so as to *suggest* a tree; and the better artist he is, the more obvious and natural the suggestion will seem. Here, the actual sense-material is slight, and is overlaid with elements contributed by suggestion. In "word-painting" the suggested factors count for still more. The sense-material consists only of words (assisted, in the case of poetry, by rhythmic and metrical forms); but the effect of the whole is produced by suggestion, arousing the mood of mind which the writer desires to awaken.

The working of creative imagination, on the part of the observer who appreciates beauty, can be traced in other ways, to which we can only make brief references here. The *fitness of means to end* discerned in the structure of the object may make even a piece of mechanism a thing of beauty; and in every case, the imaginative discernment of the purpose intended, suggestive of the creative design of the artist, his power and skill, his idea and emotion, contribute greatly to the effect.

For older but still valuable work on the subject of this section, see Bain, *Emotions and Will*, ch. xiv.; Spencer, *Principles of Psychology* (last ed.), vol. ii., pt. ix., ch. ix; Sully, *Human Mind*, vol. ii., ch. xiv., §§ 9-16. Gurney's *Power of Sound*, though written with special reference to Music, is suggestive for the general psychology of æsthetic feeling: see especially ch. iv., v., vi., and ix., on the feeling for form and order in beauty. The reader of German should on no account neglect the treatment of this subject in Jodl, *Lehrbuch der Psychologie*.

The theory that æsthetic appreciation, on its emotional side, is simply pleasure, can be maintained only with so many explanations and qualifications (H. R. Marshall, *The Beautiful*, London, 1924) that the most reasonable course is to restate the theory altogether. It is a specific kind of pleasure; and this statement should be understood in the light of our argument (ch. viii., § 1, above) for the admission of qualitative differences. To say that "all pleasures are in themselves of the same nature" is either a truism ("pleasure in the abstract is pleasure") or rests on an illegitimate abstraction of pleasure from its conditions. Some fundamental conditions of a general character, affecting the enjoyment of beauty, have been pointed out above. The variety of the forms which such conditions take is shown in the experimental investigations of Mr E. Bullough, "The Perceptive Problem in the Æsthetic Appreciation of Single Colours," *Brit. J. Psych.*, vol. ii., 1909, and "The

Perception Problem in the Æsthetic Appreciation of Simple Colour-combinations," *ibid.*, vol. iii., 1911; Dr C. S. Myers, "Individual Differences in Listening to Music," *ibid.*, vol. xiii., 1923; Professor C. A. Valentine, *The Experimental Psychology of Beauty.*

§ 6. *Biological and psycho-physical theories.*—Both forms of the purely psychological theory of pleasure and pain meet with difficulties in the case of simple sensations. These theories are applicable to the pleasures and pains of the higher senses (sight and hearing) and to those of muscular exercise; but in the case of the lower senses and the internal sensations, these assumptions of furthered or impeded attention, or tendency towards an end, are inapplicable.

The most familiar form of the *evolutionary biological* theory is that of Spencer; pleasures are the incentives to acts which tend to support life, and pains deterrents from acts which tend to destroy life. This is regarded as the result of natural selection, since races of animals whose pleasures corresponded to life-destroying acts and pains to life-preserving acts would inevitably perish. A creature so organised would find pleasure and delight in what was deadly to itself. This is certainly true to some extent; but two observations are necessary. (*a*) The principle does not afford any *general law* applicable to all pleasures and pains; for to preserve the species in the struggle for existence, it is not necessary that *every* pleasure should coincide with benefit to the bodily life as a whole, and *every* pain with the opposite. (*b*) Even if it did afford a general law, it would have only a partial application to the human race; for men are more complex than the lower animals, the "unfit" (biologically) are not allowed to disappear, and the human environment is always changing and rendering

impossible any permanent adaptation. Spencer himself points out the far-reaching divergence which exists between pleasures and acts beneficial to the bodily life; although he looks forward to a time when a perfect coincidence between the two will have been evolved.

Bain states a principle connecting feeling and organic life thus: "States of pleasure are concomitant with an increase, states of pain with a decrease, of some or all of the vital functions."[1] This statement is applicable on the whole in the region of internal sensation; but there are exceptions. Severe organic derangements—such as consumption—may be almost painless; and the pain of an organic sensation may be out of all proportion to the organic injury involved (as in the case of toothache). It is very difficult, however, to apply Bain's view at all to the special sensations. Why, for instance, should the odour of a rose or the notes of a nightingale be pleasant, and the odour of sulphuretted hydrogen or the voice of a corncrake be so much the reverse? There is no increase or abatement of vital functions corresponding to the difference. Finally, in the case of feelings aroused by perceived objects, by imaginations, by memories, by ideals, the merely biological theory becomes unworkable. The development of these mental processes never has been and cannot be explained merely as a succession of devices for securing the efficient performance of *physiological functions* in the proper sense of the term, in which it is restricted to processes known to form part of the life of the bodily organism. The same remark applies to Ribot's view that pleasures and pains are the symptoms in consciousness of the satisfaction and dissatisfaction of "organic needs," if by the latter term we mean "physiological needs"; for physi-

[1] *Mental and Moral Science*, p. 75.

ological "needs" are those, and only those, which are necessary to the maintenance of bodily life. But Ribot, like other writers who are fond of talking in physiological terms, really widens the meaning of "organic needs" to include the whole range of *conscious desires* in addition to bodily needs; so that his theory in effect joins on to the psychological one (§ 2, ii.).

The *psycho-physical* theories look for a physiological correlate of pleasure and pain in special states of the central nervous system. It cannot be said that any such theory has yet been found to cover the whole ground even for the affective tone of sensation. The most hopeful theories are those that refer to the processes of *waste and repair* in the nervous system, and consider pleasure to be accompanied on the physiological side by a maximum of stimulation (and consequent nerve-action) *together with* a minimum of fatigue (unrepaired waste or undestroyed toxic substances).

The psychological theory is set forth by Ward, *Principles*, ch. x., and by Stout, *Manual*, 3rd ed., bk. ii., ch. viii., bk. iii., pt. i., ch. iv., and bk. iv., ch. ix.; also *Analytic Psychology*, vol. ii., last chapter. It is tenable only if connected with the fundamental principle that the mind is essentially active in relation to its environment. Psychologists who take an inadequate view of mental activity can give no general theory of feeling in psychological terms. Thus, Sully (vol. ii., ch. xviii., § 2) states that "the most obvious general differentiating circumstance in all conative phenomena is the presence of the psychical correlative of muscular action; our consciousness of activity is based on the common peculiarities of our muscular sensibility."[1] But he also states that all the higher and more specialised forms of volition involve *also* "a psychical antecedent in the way of consciousness of purpose or forecasting of end," *ib.* (§3), for which the most comprehensive name is Desire. This statement provides the foundation for a psychological theory of activity and its connection with feeling, but no such theory is given.

[1] This is essentially the view criticised above, chap. vii., § 10.

For the biological theory of pleasure and pain see Spencer, *Principles of Psychology*, vol. i., § 124 (cf. *Data of Ethics*, ch. vi.); Grant Allen, *Physiological Æsthetics;* Schneider, *Freud u. Leid d. Menschengeschlechts.* The theory is reviewed by Ribot, *Psychology of the Emotions*, pt. i., ch. vi., and criticised by Külpe, *Outlines*, § 41. The connection with "organic welfare" is carefully examined by Lehmann, pp. 146-151.

Various forms of the psycho-physical theory are discussed in Marshall, *Pain, Pleasure, and Æsthetics* (Marshall's own view is examined by Stout, *Manual*, bk. ii., ch. i., § 6); in Külpe, *Outlines*, § 41; in Lehmann, pp. 152-161, and Ribot, *loc. cit.*

CHAPTER XI.

THE PERCEPTION OF OBJECTS.

In our description of the sensations of the special senses, we pointed out that, while for purposes of exposition and analysis the sensations may be treated as separate units, they do not so occur in our normal experience. Hence we observed that the difference between sensation and perception is one of degree only (ch. ix., § 1). In both sensation and perception we experience a fact as an immediately present outward reality. When our experience of it—so far as our consciousness goes—is that of a comparatively simple quality, we call the mental process a sensation. The fuller of relations it is, the more it is localised, compared, classed, and so forth, the more unreservedly we call the state of mind a perception. On this understanding, we may say, in short, that perception is the consciousness of particular material things present to sense. It involves nerve-currents coming in from the periphery, and arousing more or less voluminous reproductive processes in the cortex.

We may distinguish three stages or psychological levels of perception.

§ 1. *Perception without recognition.*—In its most elementary form, we find the minimum of intellectual consciousness which is necessary for a simple sense-initiated process to be discerned,—for a definite

impression to be experienced as such :t memory-images (in some degree) against the continuous:nce has no con- experience. Mere discernment, accomp., and therefore lowest level of retentiveness, may be maintai. any of the higher capacities of the mind com. life, with play,—or even before they are developed. effects

The best illustrations of this are found in the mental life characteristic of the lowest animals, such as fishes. If we take, as the index of psychical life, the capacity for movement in response to sense-stimulus, it would seem that the movements of a fish are prompted and guided by its senses *separately and not collectively*,—in other words, it can *discern* a sensation (it can see, smell, and even hear and taste), but cannot *combine* different sensations into the perception of an object, and very often cannot *recognise* a sensation which recurs. Professor Ward has quoted from a very interesting paper by Mr Bateson (on "The Sense-organs and Perceptions of Fishes") some curious evidence on this point, and has drawn some important conclusions from it. After indicating that the dogfish seeks its food exclusively by scent, and the carp exclusively by sight, he continues: "Again, Mr Bateson observes, 'There can be no doubt that soles also perceive objects approaching them, for they bury themselves if a stroke is made at them with a landing-net; yet they have no recognition of a worm held immediately over their heads, and will not take it even if it touch them, but continue to feel for it aimlessly at the bottom of the tank, being aware of its presence by the sense of smell. Soles, eels, and rocklings, moreover, have a clear appreciation of light and darkness, being always buried or hidden by day (unless food is thrown in), but swimming freely about the tank like other fish at night. When thus swimming at large they bury or hide themselves if a light be flashed upon

and loaches have some appreciation of
and occasionally snap at them, but their
.ons are extremely vague. . . . Pollack,
excellent sight, take no notice of a *straight*
d up and waved outside the tank, but if the wire
.nt into a sinuous curve like the body of a swimming worm, they will often dash at the glass in the attempt to seize it.' When a sense-impression sets up movements that are plainly unfit, we have no choice but to affirm sensation, but it must be unassimilated sensation; the rush of a moth into the candle is perhaps a suitable instance. . . . When the casual spectator at an aquarium sees dead sprats or shrimps thrown into a tank he is apt to assume that the fish who eat them recognise, as he does, a certain smell, taste, form, colour, consistency, and so forth. But presently he may learn that the scent-led feeders among them, such as the rockling, circle round in narrowing spirals, and finally gulp a stone on which a dead sprat has been smeared; while sight-led feeders, like the pollack, will dart straight at and swallow the twisted strip of bright metal which anglers call a 'spoon.' One would think that with time and adequate opportunities they might learn that all is not fish that glitters or that has a fish-like smell, and so pause for some saving differentia that would exclude fraudulent imitations. To *associate* the glitter with the smell or the smell with the glitter would be a great step towards this. A very few instances would probably suffice to furnish a cat or an otter with some such minimum of sagacity; but a fish seems scarcely ever to grow wise."[1] The reason is that the fish cannot combine sensations, even when they recur together or in close succession, into a complex percept of a single

[1] *Mind*, N.S., vol. iii., No. 12, pp. 519, 520. Cp. his *Psychological Principles*, ch. iv., §§ 3, 4, and ch. vi., § 2.

object and therefore has no distinct memory-images of these objects; its previous experience has no conscious effect on the present impression, and therefore it *cannot learn by experience.*

There is an elementary level of mental life, with actual perceptual processes, where the persisting effects of previous similar impressions make no difference to the creature's action. The burnt moth does not dread the flame (see ch. iv., § 6).

Nevertheless, retentiveness may be at work. Even if an animal is unable to learn anything from repeated sense-experiences, the experience may still be heightened in intensity or distinctness by traces of its former occurrence, although the persisting effects do not themselves rise into consciousness.

In the same way, when an animal of the mental level of the fish, led by hunger, follows by sight the movements of its prey, it has a series of sense-stimuli a, b, c, d, and each of the impressions affects and makes a difference to the next, so that the *consciousness* of the series may be represented thus: a, bm_1, cm_2, dm_3; where m_1 represents the after-effect of a, m_2 of a and b, and so on; the total effect being a rush to seize the object. Of course m_1 is not distinguished in consciousness from b, nor m_2 from c, nor m_3 from d. The meaning simply is that the consciousness produced by stimulus b is slightly different from what it would have been had a not preceded, and so on. The symbolism is employed by Professor Stout, in representing the act of discerning as a whole, series of impressions which have *continuity of interest* at the level of human mental life.

We have given illustrations from animal life because there we find cases where consciousness may never rise above mere discernment. It is, however, by a process of conscious discernment that the child gradually learns to distinguish the sensations of different senses, and

then the different qualities, &c., of each kind of sensation. It hardly needs to be said that the capacity for such discernment is slowly acquired, and, partly depending as it does on selective or feeling-prompted attention, is not acquired equally by all. The differences may arise from specialised interests,—as when a metal-worker sees many tints where other people see only a uniform glow; or from mere differences of age,—remarkable variations being found in the capacity for distinguishing colours (for instance) at different ages; or, again, from inborn differences of mental and physical constitution, of which no precise account can be given.

§ 2. *Recognition without explicit ideas.*—If animals, such as the fishes spoken of in the last section, were able to combine the data of the separate senses into the perception of an object—as young children, for example, can do,—they would be on a higher level of mental life, where the object when perceived is known to be of such and such a kind, although even here there are no separate ideas of the past. This is most commonly experienced when sensations of sight are qualified by the effects of their past union with sensations of touch or with motor sensations. We look at a suit of polished armour, and say at once that it *looks* smooth, cold, hard, &c. The sight-experience is altered by the effects of previous touch-experiences, which are just distinct enough to enable us to describe the "look" of the thing in this general way. And we shall see that so common a fact as space-perception consists (in part) of incompletely revived motor and tactual experiences.

Mere perception, perception uncomplicated by distinct ideas of memory or imagination, does not go

beyond what we have just described. It is essentially the apprehension of a sense-impression and its qualification by the effects of previous impressions; these effects being *distinct enough to determine action,* if not to be themselves named. A person who had lost all ideas of memory or imagination might still retain the capacity of perception; he would be able to *use* all familiar objects rightly, and describe them when present to his senses; he might even understand the practical meaning of words, so as to do what he was told; but he would have no idea of anything not present to his senses.[1]

An animal must have reached this second level before it can *learn by experience.* What we mean by this is illustrated in the cases already referred to (ch. iv., § 6, p. 87). The following, from Lloyd Morgan's *Habit and Instinct*, is an instructive example: "A young chick, two days old, had learnt to pick out pieces of yolk from others of white of egg. I cut little pieces of orange-peel of about the same size as the pieces of yolk, and one of these was soon seized but at once relinquished, the chick shaking his head. Seizing another, he held it for a moment in the bill, but then dropped it and scratched at the base of his beak. That was enough; he could not again be induced to seize a piece of orange-peel. The obnoxious material was now removed and pieces of yolk of egg substituted, but they were left untouched, being probably taken for orange-peel. Subsequently he looked at the yolk with hesitation, but presently pecked doubtfully, not seizing but merely touching. Then he pecked again, seized, and swallowed."[2]

[1] For comments on such cases, see Ward's article in *Mind*, N.S., vol. iii., No. 12, pp. 511-516.

[2] Morgan, *op. cit.*, p. 40.

Even at the risk of repetition, we must observe that in speaking of the "combination of sensations" to form a "perception," there is no implication of a mechanical aggregation of psychical units. It is, however, practically convenient to use such expressions. The different sensations are there, and the combination of them is a *new* mental reaction, itself a single whole. And we need not go beyond the level of animal life for illustrations of this. Take one of Professor Köhler's experiments. Two greys, A and B, of which B is the lighter, are placed side by side, and an animal is trained to take food from B; it is then given a pair of greys, B and C, of which C is lighter than B. It is found that the animal goes not to the grey B from which it had previously taken food, but to C. The animal reacts not to either sensation singly but to the step between the greys, the relation between them, the *bearing* of one upon the other.[1] Another kindred experiment is equally interesting. Two photographs were prepared: one of a large cluster of bananas, the other of a large stone roughly of the same outline as the cluster. The background was the same in both cases. The two pictures were shown to the chimpanzee for him to choose one. After every choice, whether "right" (*i.e.*, choice of the banana picture) or "wrong," the animal was fed with bananas; his choices were thus free from external influences. In the majority of cases he chose the banana picture.[2] The banana picture was evidently apprehended as a whole, qualified by the interest and other effects of the previous experiences.

[1] The experiments are quoted and discussed by Professor K. Koffka, *The Growth of the Mind* (Eng. tr.), pp. 137ff., 221, and 357 (where references are given).

[2] Köhler, *Mentality of Apes* (Eng. tr.), pp. 339, 340 (where the pictures are reproduced).

In like manner at the level of human life: when we hear a bar of music, for example, our experience is not accounted for by describing the separate notes: what we actually experience is the *form* of the combination; analysis into its separate notes destroys the character of the experience.[1] In human experience, recognition of a melody which had been heard before would probably lead to more or less distinct memories; but this is not necessary to a full *perception* of it and to a *recognition* of its familiarity.

At this level of perception, therefore, there need not be any separate or distinct recalling of a past experience; it is enough if the previous experience leaves behind it a cumulative effect. This gives to the recurring experience a feeling of familiarity, which is pleasant or unpleasant according as the consequences on the former occasion were one or the other. The cumulative effect of the first experience does not itself emerge into consciousness as a separate item or factor; but it makes so much difference to the second experience that the action is different.

This kind of retentiveness plays a great part in the animal mind and in the first developments of the infant mind. The mark of it, as we have said, is the capacity to learn by experience. The feeling of familiarity which it causes need not be definitely pleasant or unpleasant; it may lead to entire indifference, so that no attention is aroused. This happens with many of the most familiar recurring experiences of our daily life. But when it does give rise to such a feeling it is rightly described as the beginning of the recognition of an object. The sensation, with which the effects of past experience are assimilated, is no longer a mere sensation. We do not

[1] Compare Stout, *Analytic Psychology*, vol. i., ch. iii. and iv.

merely discern it and act reflexly in response. The effects of past experience have given it a *meaning;* and though at this level it is only a felt meaning, it leads to the modification of action and is the beginning of knowledge.

We must beware of falling into the assumption that visual perception is (so to speak) the standard and typical form of the process. If I close my eyes and an object is placed in my hand, I *perceive* it, if it is familiar at all. Similarly I may *perceive* an object by hearing *alone*, a distant train, for example; or an object of characteristic and familiar odour by smell alone. Visual perception is less liable to error, and in the course of evolution has come to monopolise the field in such a way that the other senses appear to play only a secondary part.

This leads naturally to the subject of the following section.

§ 3. *Recognition with explicit ideas.*—When explicit ideas of memory and imagination disengage themselves from the vague background of past experience and become associated with the present impression, we have a further stage in the process of perception, and also a further development of retentiveness. In this case the traces left by past experience are strong enough to produce ideas which are recognised as representing the past, and which can be compared with and distinguished from the present experience, and to that extent are independent of the latter. In the adult human mind mere perception (unattended by free ideas) rarely occurs; the processes of perception and ideation run into one another, and the ideas are regarded as part of the perception.

The laws, or rather the law, of Association will be

explained in the following chapter. At this point we only wish to illustrate the way in which a percept, in the stricter sense of the word (§ 2), may be overlaid with ideas from past experience. I am walking along a country road and see in the distance a dark object moving on the road. No sooner have I discriminated it than I am unable to shake off the suggestion that it is my friend M. As I continue on my way I expect to see the familiar form, and should be surprised if it turned out to be, say, an old woman or a labourer. The physical stimulus arouses only an ill-defined sensation, or small group of sensations, of colour. With this are combined traces enough of past experience to warrant the recognition of the percept as that of a human being; and this now becomes surrounded with a small army of qualities, memory-images, for which there is no direct sense-warrant. My final perception is strongly biassed by the images which have combined with the initial percept. These images are themselves controlled by some conscious or subconscious interest in the mind at the time. Had I not any focal, or marginal, or subconscious thoughts in my mind concerning M., my perception of him at such a distance would have been an entirely abnormal event.

When these accessory images are less definite and insistent, we may hesitate as to what the object is; rival images, none of them clear enough to expel the others, arise; then we begin to reason as to the probabilities of the case. This is distinct, conscious inference. Even the reading of an image into the initial percept has been called by some writers "implicit inference" (or, inaccurately, "unconscious inference"); and it may be called inference because there is a combination or synthesis of presented and represented

facts into a new whole, and then a statement of what the whole is.[1]

The explicit ideas revived by the present sense-impression may go off into a train of thought, memory or imagination, which is independent of the perception and takes us away from it. I may be, for example, on a steamer and sailing along the coast. I see the woods, hear the splash of the water, note the sighing of the wind, am aware of the conversation of the people about me, and so forth. Now the sight of the woods may set in motion a series of free ideas. I may think of one spot in it which especially pleases me; from that I pass to the idea of similar scenes; a forest landscape by a famous painter occurs to me; where did I see it? In the National Gallery? In the National Gallery I saw also . . . During the course of this current of ideas the water continues to splash, the wind to sigh, the company to converse, without any of the percepts which they occasion being able to interrupt the memory train.

Nothing of this kind, however, need happen. The explicit ideas may be tied to the percept by the same interest which revives them: especially when they help us to guide some kind of activity prompted by the thing perceived. A good example of this is the deliberate endeavour to imitate what we have observed some one else doing. Here we have a high degree of dependence on memory, although the activity is perceptual. But every endeavour to solve a practical problem illustrates the union of perception and ideation. We may avail ourselves of an example given by Professor Stout, in

[1] This corresponds to the essential nature of all inference, which is the combination or synthesis of certain *data* (the "premises") into a new whole (the "conclusion").—See ch. xiv., below.

another connection:[1] "Let us suppose that a person sets himself to solve one of those wire or cane puzzles which we owe to the ingenuity of the Hindoos. There are two modes of procedure open to him: he may work with his head or with his hands. Usually, if he be experienced, he mingles the two methods; but for our purpose it is necessary to place them in sharp contrast. If he is simply fumbling with his fingers, it sometimes happens that he hits on the right process by accident; but when this is so, he is unable to put the puzzle together again, or when it is put together for him, to do it the next time he tries. On this method it is also a frequent occurrence that he tries repeatedly ways of manipulation which have proved unsuccessful. Now, the characteristic feature of this method is the failure to compare with each other the various alternatives which present themselves. There is a transition from one attempt to another attempt; but the transition is not guided and controlled by *consideration of the points in which the new attempt differs from the old.* The systematic worker, on the other hand, tries to make clear to his mind beforehand whether the new trial will conduct him to the same difficulty which he had encountered in preceding trials; or, if he fails to see this beforehand, he takes notice of it when it occurs. . . . A simpler instance is afforded by any attempt to fix in our minds the position of an object, so that we may be able to find it again. In general, our perception of where a thing is, is a consequence of perceiving it at all; but wherever there is a motive for explicitly defining its whereabouts, so that we may be sure of remembering it, we find ourselves

[1] *Analytic Psychology*, vol. ii., ch. ix., § 1.

comparing its position with that of other objects. The thieves who visited Ali Baba's house saved themselves the trouble of comparison by putting a cross on the door; but when the captain himself came, he probably noted the position of each of the surrounding objects, and compared it with that of the house, fixing the points of resemblance and difference." Explicit ideas guide the activity.

Professor Lloyd Morgan[1] describes a series of experiments testing the capacity of a dog to learn by trial and error how to carry a stick through some railings. The experiments show that when the animal hit on the right way, or was shown it, he had no appreciation of the points in which it differed from the unsuccessful attempts. In such cases animals learn from experience very slowly, and only because the constant failure of the wrong attempts gradually decreases the probability of their renewal. The memory-images of the wrong methods become tinged with the pain of obstruction and failure: there is recognition without explicit ideas.

The presence of memory-images, attendant on the perception of an object, brings to light another aspect of the process. To perceive is to classify; explicit recognition, by means of memory, is classification. If we cannot find a class—in other words, if the object is like nothing in our previous experience, we are completely at a loss. Our state of mind would resemble that of Robinson Crusoe's man Friday when for the first time he saw a sailing-ship approaching the island. The reader should analyse the difference between this experience and that of Crusoe himself when he saw the ship.

[1] See his *Comparative Psychology*, ch. ii.

Psychologists who abide by the English "Associationist" tradition naturally regarded Perception as essentially a combination of units,—an "elaboration," as it was sometimes called, of given data. Sully's *Human Mind*, vol. ii., ch. vii., is an instructive example of this. The author describes the various factors of perception very well, but fails to arrange them clearly according to difference of mental level. What we have called "simple recognition" and "recognition with explicit ideas" are called by Sully "automatic assimilation" and "comparative assimilation" respectively. The former, he rightly says, provides only for a sense of familiarity; the latter is a definite apprehension of likeness. Mr Sully appears, however, to exaggerate the affinity between the mechanical or automatic side of the two processes; automatic assimilation, he says, is "the calling up by a present sensation of the trace or residuum of a past sensation (or sensations), which trace *merges in or coalesces with* the new sensation, being discernible only through the aspect of familiarity which it imparts to the sensation" (vol. i. p. 181; italics ours). If this means that when (for example) we have an old sensation, and a new one *like* it, there are two distinct processes, (*a*) the revival of the trace of the old sensation, and (*b*) the coalescence or fusion of this trace with the new sensation, then we must insist that there is no evidence for (*a*) as a distinct process from (*b*).

Mr Sully justly observes that "just as a subconscious stage of the sensation precedes and determines the reaction of attention on this sensation, so a vague impression of two different sensations precedes attention to them as different; at the same time, it is evident that such a vague awareness of different sensations is not to be confounded with the clear consciousness of them as different which follows on a direction of the attention" (*Human Mind*, vol. i., ch. vii., § 2, p. 171). In fact it is clear that a differentiation, at whatever level it occurs, must be *felt* in order to be *known* ("feeling" here stands for the vague immediate experience referred to above). In certain cases, and very familiar ones, a definite judgment of Comparison is made on a basis of similar immediate experience without attention to both the objects. Of two successive sounds, we can directly perceive the

second to be louder or softer without reproducing a *memory-image* of the first. Experiments on the "least noticeable difference," in the case of sensations, afford further illustrations. Such facts suggest that Professor James is right in affirming that, in simple cases, such as the comparison of purple with blue and with red, there may be a similar direct experience or feeling of "simple resemblance," when both objects are present to sense (*Principles*, vol. i. p. 532).

Complete treatment of the topic "Comparison" belongs of course to the Psychology of Ideation (see Stout, *Manual*, bk. iv., ch. iv., § 3; *Analytic Psychology*, vol. ii., ch. ix.); see also ch. xiv., § 4 (in connection with the part played by Language).

§ 4. *Perception of external reality.*—In comparing and contrasting these three stages of perceptual activity, we have implied that perception is of *external objects in space and time.* We must now analyse these aspects of the process, with special reference to the perception of single objects or groups of objects. The perception or knowledge of the external *world*—that is, of objects and events as interconnected into a unified system—is possible only at the higher level of conceptual thought, language, and intercourse between mind and mind.

The perception of an object, as we have shown, involves the combination of different qualities; it is always an act of synthesis. A perceived object is qualified in the following ways: (*a*) it has comparative independence,—it does not cease to exist when we cease to act on it; (*b*) it has spatial qualities: (1) it is solid or resistant—*i.e.*, it *fills* space; (2) it has a certain form and size, and it is situated at a certain distance and direction (our own body being, in the last resort, the starting-point or point of spatial reference); (*c*) it may have one or more of the qualities of colour, sound, temperature, smell, taste; (*d*) it has other qualities besides those which we perceive, and

some perhaps which we have never perceived; (*e*) although its qualities are many, and are liable to change, it remains (within limits) one and the same thing.

These qualities ascribed to perceived objects are of two kinds, which have been distinguished as "primary" and "secondary" qualities. The psychological importance of the distinction rests on the relations of the two kinds of quality to our muscular activity. The "primary" qualities are solidity, extension (including form and size), distance and direction (including motion and rest); the "secondary" qualities are colour, sound, temperature, smell, taste, referred to under (*c*) above. There is good reason, as we shall see, for believing that our muscular sensations play a much larger part in the apprehension of the primary than in that of the secondary qualities. The primary qualities are *psychologically* more fundamental; that is, if we had not acquired any perception of solidity, extension, &c., we should not regard colours, sounds, &c., as qualities of "things" occupying space to the exclusion of other "things."

The most fundamental characteristic of perceived objects is referred to under (*a*) above,—their comparative independence with respect to our movements. For cases where there is no such independence of sensation with respect to movement, consider the motor or kinæsthetic sensations (ch. ix., § 6); these arise only from the changing states of muscle, joints, tendons, &c., which accompany movements of the body and limbs. They simply *are* our internal feeling of these movements. We never regard these sensations as qualities of external things.[1] Yet, in the case of the external senses, the processes which the

[1] Unless in the case where for some reason we regard the body or part of it as an external object—*e.g.*, we can tire out a muscle, and then we should say, "My arm is very tired, but I am not."

psychologist calls sensations are never, in common life, regarded as mere "sensations"; they are regarded as sense-qualities of things. This is first of all because changes in these sensations can be distinguished from feelings of muscular movement, and can be to a greater or less extent controlled by muscular movement, but always within limits dictated by something else. I open my eyes, and by moving them or moving my head I can control the fact of "what to look at," but the general way in which visual objects are presented to me is beyond my control. I move my arm, and so control my tactual experiences, but the control is limited by conditions which fix the fact whether my movements shall be impeded or not, or the kind of resistance that they shall receive.

Professor Stout has expressed this general conclusion by saying that the perception of externality first arises in connection with *motor adaptation* in striving towards an end—*i.e.*, in conation. Motor adaptation involves at once and in intimate union the partial dependence and partial independence of sense-experience in relation to motor control; so far as sense-experience is merely dependent on our motor activity, we do not apprehend it as qualifying an external object; so far as it is relatively independent, we do normally apprehend it as qualifying an external object."[1] This is a wide generalisation, and includes a factor on which great stress was laid by the earlier English psychologists—the "perception of resistance."

We now turn to the two most fundamental attributes of the external reality thus perceived, space and time.

§ 5. *Character of space-perception.*—Our developed

[1] See his *Groundwork of Psychology*, ch. ix., and *Manual*, bk. iii., pt. ii., ch. ii.

perception of space is a perception of a special kind of relation between objects which, as we say, are "in space." This relation involves (*a*) motion and (*b*) coexistence. (*a*) Objects are perceived at various *distances* and *directions*,—the percipient himself being, directly or indirectly, the point of reference (*form* and *size* can be brought under this head, as consisting in distance and direction of parts within an object). The meaning of these terms is not, however, fully brought out unless we introduce the idea of *motion*. A thing may move along a line for any distance in any direction if unresisted by other things; and the line itself may move in any direction. Any such motion is *continuous*, and consists of a continuous *series of positions*. (*b*) But the perception of space is not only that of distances and directions regarded merely as quantities that can be covered by so much motion. We get at the most essential mark of perceived space when we consider the meaning of such expressions as we use in speaking of one thing as being *above*, *below*, *outside*, *inside*, another. The relation which we have in mind is expressed by the term *coexistence*—or, if we may coin an English word, side-by-sideness—as distinguished from mere *succession*. In mere succession, one thing is over before the next begins; in space, both may exist at the same time "side by side."

We must not confuse space as *conceived* and space as *perceived*. "Properly speaking, there is no *perception* of space considered as an individual unity boundless in extent and comprehending within it all the places and distances of the contents of the physical universe: this is a concept, not a percept." The same is true of the various kinds of space treated of in modern Geometry.

§ 6. *Theories of space-perception.*—Psychological

theories of space-perception have been divided into "nativistic" and "genetic" theories. The extreme form of the "nativist" theory holds that space-perception is psychologically a fact behind which we cannot go, so that no account of its development can be given; on the other hand, the extreme form of the "genetic theory"—the "purely empirical" theory, as it has been called—in professing to explain space-perception, explains it *away*, since, in the words of its clearest exponent (J. S. Mill), its net result is to show that our perception of Space "is at bottom one of Time."

The position taken in this book is that we cannot explain space out of something which is *not* space, nor the developed perception of space out of an experience which has nothing spatial about it. But we can ascertain the factors which lead to a development from a vague, imperfect, indefinite spatial experience to the definite space-perception characteristic of the normal adult human mind.

The extreme empirical theory of space-perception is now mainly of historical interest. It was expounded and defended, in its most characteristic form, by Alexander Bain. We quote from a very clear summary of it (partly in Bain's own words) in Mill's *Examination of Hamilton's Philosophy*, ch. xiii.: "Bain recognises two principal kinds or modes of discriminative sensibility in the muscular sense [for the present Mill has set aside visual perception; the analysis consists largely in the reference of space-perception to the muscular sense]: one corresponding to the degree of intensity of the muscular effort and the amount of energy put forth; the other corresponding to the duration, the longer or shorter continuance of the same effort. The first makes us acquainted with degrees of resistance which we estimate by the intensity of the

muscular effort required to overcome it; to the second we owe our idea of extension. By it we discriminate the extent of range of a movement. 'When a muscle begins to contract or a limb to bend, we have a distinct sense of how far the contraction and the bending are carried. . . . If the sense of degrees of range be thus admitted as a genuine muscular discrimination, . . it gives the feeling of linear extension, inasmuch as this is measured by the sweep of a limb, or other organ moved by the muscles. The inward impression corresponding to the outward fact of six inches in length . . . is the impression of a muscular effort having a certain continuance; a greater length produces a greater continuance (or a more rapid movement). . . . The discrimination of length in any one direction includes that of *extension* in any direction. Whether it be length, breadth, or height, the perception has precisely the same character. Hence superficial or solid dimensions, the size or magnitude of a solid object, come to be felt in a similar manner. It will be obvious that what is called *situation* or locality must come under the same head, as these are measured by distance taken along with direction.' . . . The sensation of muscular motion unimpeded constitutes our notion of empty space, and the sensation of muscular motion impeded constitutes that of filled space. Space is *room*,—room for movement; which its German name, *Raum*, distinctly confirms. . . . An intervening series of muscular sensations before the one object can be reached from the other, is the only peculiarity which distinguishes simultaneity in space [coexistence] from the simultaneity [in time only] which may exist between a taste and a colour, or a taste and a smell. . . . The notion of length in space, not being in our consciousness originally, is constructed by the mind's laws out of the notion

of length in time," the shorter or longer time which it takes "to attain from some one feeling to another." The result of the theory is, that space is resolved into time.

Hence we said that such a method of explaining space-perception explains away its most characteristic features. If space consisted merely of distances and directions measured from the percipient by so much movement, Bain's analysis might hold; but the most characteristic features of space are summed up in the word "coexistence"; "simultaneity" refers only to time. A thing "in space" consists of *partes extra partes*, parts outside one another; sensations come to us not only with qualitative differences and time differences,—they come, as it were, laid out side by side.

If we look back at the terms used by Bain, we shall find he unconsciously *assumes* space. He speaks of the "sweep of a limb," the "extent or range of a movement." These terms imply space already, and unless we take them in a spatial sense they have no meaning. The very thought of a *series of muscular sensations*—*i.e.*, of *time* occupied, is involuntarily supplemented by the idea of a line—*i.e.*, of space; the words suggest to us the visual image of the space traversed or the tactual image of a line as feeling along a surface. But if we strictly confine our attention to muscular sensations alone, these do not coexist; they only follow one another in time, and coexistence cannot be got out of them.

It is now generally recognised that sensations of sight and touch, if not others, are characterised not only by quality, intensity, and duration; but that some at least of them have a characteristic which is rather one of quantity than quality, but of vague quantity. It has been called "extensity," "voluminousness," or "massive-

ness." Whether this belongs to all our sensations—as Professor James thinks—or only to some of them, is a point of minor importance for our present purpose. "We call the reverberations of a thunder-storm more voluminous than the squeaking of a slate-pencil; the entrance into a warm bath gives our skin a more massive feeling than the prick of a pin; a little neuralgic pain, fine as a cobweb, in the face seems less extensive than the heavy soreness of a boil or the vast discomfort of a cólic or a lumbago."[1] Professor James goes on to quote from Hering some telling illustrations of the same characteristic in sensations of sight and touch. "Glowing iron looks luminous through and through, and so does a flame." A similar voluminous quality, says Hering, belongs to the darkness seen with closed eyes, or in a dark room with open eyes, or even in a dark corner of an otherwise well-lighted room; and to cutaneous feelings of temperature. By mapping out this *primitive sense of volume*—which certainly belongs to sensations of sight and touch—we get accurate local discrimination of positions outside each other. The sense of volume contains only the *possibility* of these distinctions; they lie potentially in it, but we are not aware of them till a later date when we have brought movement into play.

§ 7. *Perception of the body: local signs.*—The young child explores his own body as much as, or more than, anything else. This combines motor sensations with innumerable sensations of touch all over the surface of the body, and these tactual experiences have qualitative differences corresponding to the different parts that are touched. These qualitative differences

[1] James, *Principles*, vol. ii. p. 135 (ch. xx.).

are called "local signs" because they come to act as indicators of special positions. This is the result of a process of learning; and during the first year of life these local signs may be very imperfect guides. For example, a toddling child has been observed to knock the side of her head against something that came in her way, and immediately after, to rub the other side of her head. Knowledge of the shape and size of the body is not *given*; it is the result of experiment, observation, and association.

Movements of the body bringing it into contact with external objects are also followed by tactual sensation. But between the two cases there is this extremely important difference: the child actively touching his own body feels a sensation of *double contact*,—in the part which touches and in that which is touched: when he actively touches an external object, he feels a sensation of single contact. This fact is of fundamental importance for the perceptive distinction of the body from things outside it. When an external object touches the body, not as a consequence of a movement of the latter, the experience has been called "passive touch" (to distinguish it from the "active touch" mentioned already), and in this case there is a like sensation of single contact. So far we have spoken of touch alone. But *vision* unites with these tactual and motor sensations to make the perception of the body still more definite. In cases of touch—whether one part of the body touches another, or touches an outside object—there is *visible contact* along with the tactual sense of it. With this visible contact many kinds of pleasures and pains (bruises and other hurts) are immediately connected.

The essential *difference* between the body and the

things outside it is, that the body is always with us, and is inseparable from ourself (through the union of organic and muscular sensations); the essential *resemblance* is that one part of the body can perceive another, just as it can perceive objects outside it.

The expression "local sign," first used by the German psychologist and philosopher Hermann Lotze, has not always been employed in the same sense. We shall use it to signify certain qualitative differences in perception according as the sensory experience involved is connected with one part of the body rather than another. Local signs belong to sight as well as touch. Physiology supports the assumption that they really exist. Scarcely two points of the sensitive surface of the body are anatomically alike. Nerve-endings differ in different places; the parts differ also in the nature of the tissues underlying them. So a sensation received by one part would feel different from a sensation received by another part. The same holds good in the case of sight; in the retina differences in colour-sensibility may serve as local signs—*i.e.*, may come to be interpreted in terms of space.

It is no longer possible, however, to regard the local sign as a function of the specific peculiarities of any single nerve. It is derived from a complex system of nerves. The investigations of Dr Head, Dr Rivers, and their collaborators (*Studies in Neurology*, Oxford, 1920) have placed this beyond doubt. Hence Professor Spearman (*Nature of Intelligence and Principles of Cognition*, p. 40) goes so far as to say that all the nerves, directly and indirectly excited by a given external stimulus, in conjunction appear to be the sole and complete determinants of the conscious localisation; "they determine it according to their rigidly fixed psycho-physiological properties rather than according to the real bodily place" of the stimulus. In this connection he

mentions "gross errors of localisation" which may occur in special cases: "the stimulation of a nerve still seems to be located at its peripheral extremity, even when actually occurring anywhere along the whole course of its axon; a familiar instance is the tingling which is localised by consciousness in the fingers, although its physical stimulation is situated at the point where the nerve passes behind the internal condyle; and again, even when a limb has been amputated, a stimulation which really occurs at the stump has still the semblance of occurring at the extremity although this no longer exists" (*op. cit.*, p. 40). See also Spearman's article, "Analysis of Localisation, illustrated in a Brown-Sequard Case," *Brit. J. Psych.*, vol. i. (1905).

§ 8. *Perception of the body: motor sensations.*—The significance of motor or kinæsthetic sensations derived from parts of the body which are *seen to move* soon come to be appreciated by the child. All normal babies, during the first few months, devote a good deal of time to the intensive study of their own hands. It is easy to see how interesting these objects become; they are always available, they assume so many different appearances, and they give such ready response to varied efforts. It is only after he has attained practical meaning of the various motor sensations involved, that the child begins to take his hands as a matter of course. The more intelligent child learns this lesson very quickly. In a backward child the process of learning has been observed to be still in evidence towards the end of the second year. Motor sensations from all parts of the body come to be understood so well that we come to know the rate and direction of movement of any part of the body without the aid of vision. If the arm is bent first through four inches and then through eight inches, the second movement gives rise to a longer and partly different series of

motor sensations. The same applies to movements in different directions, whether or not one is longer than the other; the motor sensations are different. So they are in the case of movements differing in velocity.

Mere infants show signs of some power of space perception—*e.g.*, of surprise if brought into a familiar room by an unaccustomed door. And they sense the difference between one room and another. It is an interesting thing to see a babe four or five weeks old craning his little head to make out what has happened when there has been a complete change from his familiar surroundings. There is certainly some perception of outwardness, of distance, and of direction.

It may be that there are congenital differences in sensing direction. This capacity is marvellously developed in some animals; and human beings seem to vary considerably in their power to orient themselves. Form and direction as realised by the sense of sight seem to depend on different factors. Children often are quite clear about a particular form, but they pay little heed to direction. In copying letters from the board some children will reverse them or even invert them: b and d are often confused in this way, as are p and q. In the same way a drawing or other object may be inverted or reversed when copied. Little children are often indifferent as to whether they hold their pictures right side up or not.

These spatial relations are among the many relations which become clear to the child through his use of language. In his early experimentation he learns the practical importance of "above" and "below," "far" and "near," relatively to himself, and he finds this

practical knowledge clarified and analysed by the words which are provided for him.[1]

§ 9. *Perception of "things" or "objects."*—The perception of the body becomes of cardinal importance for the development of a fundamental factor in our apprehension of the world around us.

The body is always with us, and is inseparable from our self. We can feel it through organic and muscular sensations. But we can also see it and touch it, as we can see and touch other objects in the outer world. The body therefore becomes psychologically the type or standard of what we mean by a distinct object. The way is thus prepared for our perception of the world as consisting—so to say,—of units, called in ordinary language "things" or "objects." These terms are applied or denied to portions of the external world as suits the purpose immediately in hand; for certain purposes a waterfall, a rainbow, or even a flash of lightning, may be regarded as an object. And the object is "the same" as long as it suits our practical or scientific purposes to regard it so. When, however, we pass from the inanimate world to the world of organic life — the vegetable and animal kingdoms—we find "objects" possessing an identity and permanence of their own which cannot be affirmed or denied merely according to our convenience. On the whole, it is true to say that we regard a living thing as the same, as long as it lives.[2]

[1] The importance of language in aiding the development of the child's perception of space and of time has not been sufficiently recognised; see Margaret Drummond, *The Dawn of Mind*, ch. iv.

[2] On the conception of objects as having a "nature" or "essence" of their own, see Mellone, *Logic*, second or later edition pp. 155, 156.

The familiar distinction between animate and inanimate objects is of comparatively recent origin in the history of the human race. One of the strongest and most deeply-rooted mental habits of primitive mankind was to personify everything. The imagination of the undeveloped man, or the young child, ascribes life and consciousness to everything that moves. The researches of many anthropologists during the last fifty years have shown that among primitive men this tendency ruled their whole thought of the world: the savage is ready to treat trees, plants, rocks, rivers, and all kinds of inanimate things, as willing, thinking, feeling, more or less as he himself does.

What has really happened in the mental development of the race is this. The thought of self and the thought of an outer world arose together and grew together; and the opposition between them is the result of long and late development. It was inevitable that the contents of the two ideas should be originally similar; the agent's visible body moves and resists, and outer visible objects move and resist. There has been a gradual "depersonification" of nature, which leads to a separation of the beings in the world around us into two classes, "animate" and "inanimate." We draw the line somewhere in the borderland where the animal kingdom ends and the vegetable kingdom begins.

The personifying tendency has been called "self-projection" (see especially Stout, *Groundwork of Psychology*, ch. ix.); cp. also Höffding, *Outlines*, pp. 7, 8 (where the assumption of a personifying tendency is criticised but finally accepted as indispensable). The conception of "self-projection" is worked out, with a different terminology, in Baldwin, *Mental Development in the Child and the Race.*

Spencer, Tylor, and others have shown that *dreams* play an extraordinarily large part in moulding primitive

ideas of existence. In dreams a man sees himself and others, together with various common objects of experience. This leads to the notion of a double existence both for men and for things. All things have images or "doubles," and the "double" has a more free and ethereal existence in contrast to the physical body, which has a coarser and heavier existence. This view of the world is known as "animism." There is no doubt that the explanation is true and important; but it does not remove the need for a personifying tendency—by whatever name this tendency may be called—in primitive man, leading him to attribute an inner life, resembling his own, to forms which he recognises as outwardly more or less like himself. The "double" seen in dreams is a moving image, resembling the living body seen in waking life; but why should a man attribute mental life to it? It is evident that he must have had some apprehension of a mental life of his own before he could regard the image even as an animated "double." The personifying tendency must precede animism. This is the meaning of Siebeck's criticism of Tylor in the Einleitung to his *Geschichte der Psychologie*. No doubt the two ideas worked together. Similarly Avenarius, *Der Menschliche Weltbegriff* (ch. iii.), regards animism as supplementary to what he calls "introjection."

§ 10. *Developed space-perception.*—We may now summarise the conclusions implied in the foregoing sections.

The development of space-perception becomes intelligible with the co-operation of the three factors, (i) the primitive extensity or sense of volume, (ii) local signs, (iii) motor sensations. Take it first in relation to *touch*.

Touch without movement—"passive touch," as it has been called—could give us no definite perception of positions even on the surface of our own body. It could give us only a sensation such as is felt when a postage-stamp is pasted on the hand. But if we take any given surface of the body and move the finger

of the hand over it, we bring out into prominence the latent local signs. Passing our finger over it, we have (*a*) a series of muscular sensations, (*b*) a series of touches, each accompanied by these minute differences—each with its local sign. As these are all located in the primitive sense of volume, since they all have this aspect of extensity, we finally get the perception of a relative position of points—*i.e.*, of spatial coexistence. This accurate knowledge of detail is not given to start with. By thus exploring the surface of the body we get, as it were, a touch-map of the surface, in which differences come to be immediately interpreted by us in terms of space, and consequently we are able to localise in any part of the body automatically. We must emphasise the remark, already made, that the muscular movements involved in the various touches do themselves contribute to the definite spatial interpretation of the experience, since the feeling of "room to move in" is —not indeed the whole, as Mill and Bain thought, but—part of the perception of space. A particular succession of feelings of contact is accompanied by a particular succession of motor sensations. And since the touching part as well as that which is touched has its own tactual sensations and local signs, these give rise to feelings of double-contact, which when the body is touched by another object greatly facilitate the perception of external filled space. But this last-named experience is developed and receives its most characteristic features through the active exploration by touch of external objects. By this means persons who have been born blind may develop a genuine spatial perception of the world.

Turning now to *vision*, we must ask what can the eye attain to in the way of space-perception by itself?

We start, as before, with a primitive sense of volume. Optical sensations are vaguely felt from the outset as voluminous, roomy, or space-filling. We have also latent retinal local signs. Movement here is of special importance because the eye is in constant motion. These movements concern the axes of the eyes, when the two eyes converge, diverge, and sweep over the field; and the crystalline lens, which relaxes, or the reverse, to accommodate the eye to more distant or nearer objects (see ch. ix., § 8). Professor James quotes from Martin's *Human Body* the following account of the perception of distance and of size.[1] "With *one* eye, our perception of distance is very imperfect, as illustrated by the common trick of holding a ring suspended by a string in front of a person's face, and telling him to shut one eye and pass a rod from one side through the ring. If a penholder be held erect before one eye, while the other is closed, and an attempt be made to touch it with a finger moved across towards it, an error will nearly always be made. In such cases we get the only clue from the amount of effort needed to 'accommodate' the eye to see the object distinctly. When we use both eyes our perception of distance is much better; when we look at an object with two eyes the visual axes are converged on it, and the nearer the object the greater the convergence. We have [by experience] a pretty accurate knowledge of the degree of muscular effort required to converge the eyes on all tolerably near points. When objects are farther off, their apparent size, and the modifications which their retinal images

[1] James, *Text-book of Psychology*, pp. 39, 40.

experience by aerial perspective, come in to help. The relative distance of objects is easiest determined by moving the eyes; all stationary objects then appear displaced in the opposite direction (as for example, when we look out of the window of a railway car) and those nearest most rapidly; from the different apparent rates of movement we can tell which are farther and which nearer. [Such eye-movements, of course, bring about movements of the retinal image, which bring out the latent retinal local signs, as the image passes to and from the "yellow spot."] . . . The dimensions of the retinal image determine primarily the sensations on which conclusions as to size are based. The larger the visual angle, the larger the retinal image; and since the visual angle depends on the distance of an object, the correct perception of size depends largely on a correct estimate of distance; having formed a judgment, conscious or unconscious, as to that, we conclude as to size from the extent of the retinal region affected. Most people have been surprised now and then to find that what appeared a large bird in the clouds was only a small insect close to the eye; the large apparent size being due to the previous incorrect judgment as to the distance of the object. The presence of an object of tolerably well-known height also assists in forming conceptions (by comparison) as to size; artists for this purpose frequently introduce human figures to assist in giving an idea of the size of other objects represented."

In the third place, let us consider the *co-operation of sight and touch.* A space-world, of a sort, could be built up by movement and touch (including tactual signs) alone, or by movement and sight (including

retinal field of sight alone; but our actual space-perception arises from the *association between sight and touch*. From our first entrance into the world we have been learning the connection, so that at length a sight-perception becomes an indication of possible touch-perceptions. Movements of the limbs, whether intended or not, are visible, and therefore provide associations of sight and motor sensations. All the tactual exploring movements referred to above are accompanied by sight sensations of the contact (the hand and the bodily organism, or the hand and the outer object); and it is only a matter of time, with sufficiently *numerous* and *varied* instances of the conjunction of the two kinds of experience, for a visual perception at once to suggest a touch perception, which is not actually perceived but represented in idea. When, therefore, we see a solid object, or a smooth surface, our visual perception is complicated with suggestions of active touch. When we see an object at a certain distance and direction, part of our visual perception is given by suggestions of movement required to reach it, and so on. These suggestions of active touch, connected with sight sensations, are not necessarily free images of memory; they are usually dependent on the sensation, in the manner described above; though, they are so closely bound up with the sight sensation, that we have the (incorrect) impression that we see distance and direction directly and immediately.

We must repeat and emphasize the observation that all the factors of perception develop together in close connection, the perception of reality through motor sensation, the perception of the body, the perception

of objects outside the body, the perception of extension through active touch and active vision, are co-operating functions, separated only for purposes of theoretical analysis.

§ 11. *Perception of time.*—Our *idea* of time is that of a series of events, succeeding one another, capable of being divided into present, future, and past; the series extends back indefinitely into the past and forward indefinitely into the future. It is clear that at the merely perceptual level, no such idea could be formed; but it does not follow that there is no immediate perception or experience—or, as we might even say, feeling—of duration and succession.

Even at the level of recognition without explicit ideas (§ 3), an impression, lasting unchanged for a certain time, could produce by its continuance a gradually cumulative effect in consciousness,—for the discernment of it at any moment is affected by traces of its discernment at previous moments, so that the feeling of it is different as time goes on; a succession of impressions, connected together by their relation to the same impulse, will produce a similar gradually cumulative effect. The accumulation of effects varies according to the time taken up by the process. Thus even a mere impulse or a bodily feeling is felt differently according as its duration varies. The time during which it is actually being felt, the time marked by the actual occurrence of sensation and feeling, is what is meant by *the present.* Hence "the present" time is never a mathematical point or indivisible instant; it is "a sort of saddle-back of time with a certain length of its own." Professor Stout points out that it is longer or shorter according to circumstances; "on the perceptual level it is longer

when conation is obstructed or delayed, and shorter when conation proceeds successfully and easily to the attainment of its end."

With the emergence of explicit ideas, the beginning of the conscious distinction between present and past appears. The feeling of familiarity takes us beyond the present; and the complication of a present perception with vague representations of past perceptions goes further in the same direction. At this level there is indeed no distinct contrast and comparison of the present time with other times; but there is a vague consciousness of the difference resting on the actual transition between a perception and a memory-image. Consideration of this subject is continued below (ch. xii., § 10).

The main points to grasp are: (1) the meaning of *the present* (as a psychological fact, not a mathematical abstraction); (2) the fact that a present conative process (even if it is only an animal impulse) has sufficient unity of its own to give rise (through the operation of retentiveness, simply by its continuance in time) to a feeling of continuous transition; (3) that this is the most primitive experience of time, and that further development of the time-consciousness depends on ideation, and begins with the vague apprehension of a transition between the feeling and perception of the present, and the memory-images with which these are complicated.

The psychology of time is very obscure, and little light can as yet be thrown on many of the details. In this place we give the following references: Stout, *Manual*, bk. iii. (ii.), ch. vi.; bk. iv., ch. vi., § 4, ch. vii.; James, *Principles*, vol. i., ch. xv., and (more briefly) *Text-book*, ch. xvii.; Ward, *Principles*, ch. viii. A very suggestive discussion of the psychological and philosophical aspects of our time-experience will be found in Royce, *The World and the*

Individual, vol. ii. (Gifford Lectures, second series), ch. iii., pp. 113ff., and Index *s.v.* "Time." For an account of the possibilities of experimental work, see Myers, *Experimental Psychology*, 3rd ed., vol. ii., ch. xxiii.

The psychology of perception is one of the most difficult parts of the subject; but the student who has grasped the main idea of the dependence of perception on the active side of mental life, as distinguished from its passive or mechanical side, has gone far towards surmounting the difficulties. This idea is admirably expounded by Professor Stout, *Manual*, bk. iii. (more briefly in *Groundwork*, ch. ix.), and *Analytic Psychology* (throughout; esp. vol. i., ch. v., vol. ii., ch. xi.). The same idea underlies Ward's treatment, *Principles*, ch. vi.; see also his articles on "Assimilation and Association" in *Mind*, July 1893 and October 1894 (two noteworthy articles, the second and more important of which has been quoted in the foregoing chapter). James' brilliant work in *Principles*, vol. ii., ch. xix. ("Perception of 'Things'") and xxi. ("Perception of Reality"), should on no account be neglected. The same may be said of Spearman's recent work, *The Nature of Intelligence* (ch. iii., Sensation; ch. xv., Perception).

On space perception, recent study has its starting-point in James' famous chapter xx. A critical account of the question as James left it is given in McDougall, *Outline*, ch. viii., where the author appears to advocate a very extreme form of what has been called the "nativistic" theory (*Outline*, p. 245; and see above, § 5, p. 368). On recent experimental work, see Myers, *Experimental Psychology*, 3rd ed., vol. i., ch. xvii., xxii.; Titchener, same title, vol. i., pt. ii., ch. x., xi., xii.; Külpe, *Outlines*, §§ 55-62.

A very interesting illustration of the acquirement of co-ordination between spatial perception by sight and by touch is given by Mr G. M. Stratton (*Psychological Review*, vol. iii., No. 6, vol. iv., Nos. 4, 5), who wore glasses so constructed that the retinal images of external objects were *not inverted*, and succeeded in harmonising sight and touch (through movements and local signs) under these totally new circumstances.

The reader of German is referred to three important articles by Heller, *Philosophische Studien*, vol. xi. (1895), Nos. 2, 3, and 4, entitled *Studien zur Blindenpsychologie;* and to an article by Uhthoff in the *Zeitschrift für Psychologie u. Physiologie d. Sinnesorgane*, vol xiv., Nos. 3, 4, dealing with cases of successful operation on persons born blind. Another case is described by Latta, "A Case of Successful Operation for Congenital Cataract in an Adult," *British Journal of Psychology*, vol. i., pt. 2, pp. 135ff. (July 1899). Older cases are described by Hamilton, *Lectures on Metaphysics*, vol. ii., ch. xxviii., and Abbot, *Sight and Touch* (1861): the most important are those of Cheselden (1728), Franz (1840), and Nunnely (1858).

In connection with what we have said (in this chapter and elsewhere) on the meaning of psychical "combination," we may observe that Dr H. J. Watt, in *The Sensory Basis and Structure of Knowledge* (1925), has made the following observations: "When two pressure contacts are set some distance apart on the skin, we notice the presence not only of the two spots of sensation, but of another sensory datum, namely, the distance between them. We are prone to think that we somehow merely estimate or reckon by thought the distance between two such points. But this must be a mistaken view. There seems to be no means by which reason could make two spots of sensation produce a distance between them. Nor could we by any logic derive this distance from the attributes of these spots. We seem forced to admit distance as a new *datum*, adding something uniquely new to all that appertains to the two spots. But at the same time it is clear that the spots and the distance are bound together into a special whole, so that we must speak of the spots and their distance, or of the distance between the spots. This special synthesis we call *integration*; and it is important to notice carefully what is involved in the notion, namely (1) something new that is the essence or 'spirit' of the unity, and (2) the peculiar unity of the whole whereby the integrating parts and the new thing are wrought indissolubly together" (*op. cit.*, p. 75). The author discusses the development of perceptual thinking specially from this point of view, and endeavours to show

that the same principles are operative in each of the senses, which function in their respective spheres according to the same general laws.

Another aspect of the question indicated by Watt is discussed by Spearman, *Nature of Intelligence*, ch. v., vii. (the "eduction" of relations—*i.e.*, when the mental presentation of any two or more characters, simple or complex, tends to evoke immediately a knowing of the relations between them). It is clear that the mind does not simply create the changes which are discerned. The occurrence of the change must have a passive or mechanical side. If light, for example, did not differentially stimulate a particular area of the retina, and so differentially affect consciousness, there would be no special direction of the attention and hence no sense-impression experienced (cp. Sully, *Human Mind*, vol. i., ch. vii., § 2, and Stout, *Analytic Psychology*, vol. i., bk. i., ch. iii. (esp. p. 63)).

CHAPTER XII.

MEMORY.

§ 1. *Factors in memory.*—There are times when, from the multitudinous faces and figures which meet us in our daily walk, we select one and annotate it thus: "I have seen you before." We may not be able to say when or where or in what circumstances, but the sense of familiarity which accompanies the percept is a perfectly definite experience. It seems to consist in a kind of tingling which makes us feel that this particular percept has associations in our mind which might be awakened if we could only hit on the right means. We dwell on the percept, trying to strengthen it; we run over it, point by point, like a mouse in a cage trying to find an outlet; we bring up other ideas, such as those of hotels we have stayed at, societies we belong to, journeys we have made, to see if any will act as key to the puzzle. At last the spark passes, the junction is made, we exclaim, "I know; it is Mrs King, I met her in Florence; she and her husband went with us to Vallombrosa!" a host of other details springs up, a whole week or year of our lives seems to swing through our minds in a few short moments.

An analysis of this or any similar example will show that a complete act of memory involves four factors:—

a. Retention or Conservation of Presentations.

b. Their Reproduction.

c. Their Recognition as belonging to my previous experience.

d. Their Localisation in that experience.

§ 2. *Retention.* — It is maintained by many that retention and reproduction are both dependent on what James has called the elementary law of habit in the nerve centres—*i.e.*, that these centres are so constituted that when any cerebral process takes place, they are modified in such a way that the same process is liable to recur. It is as if a track were formed which directs future discharges of energy. On the other hand Bergson, while admitting the existence of what may be called habit-memory and its dependence on the laws of the physical organism, brings forward weighty arguments to show that there is also a "pure" memory of which the mode of operation does not accord with the physical and chemical laws governing organic functions.[1]

For the present we use the word retention as meaning simply the liability to recur;[2] when the recurrence actually does take place we have reproduction. The power is one which differs greatly in different individuals, and is not necessarily associated with mental grasp. People of very low intelligence frequently possess it in remarkable degree. Thus Forbes Winslow tells of an imbecile who "could remember the day when every person had been buried in the parish for thirty-five years, and could repeat with unvarying

[1] See Bergson, *Matter and Memory* (Eng. tr.), pp. 38, 147-156 *et passim*.

[2] How much is here meant by the word "recur" is doubtful; it certainly does not mean that in reproduction the whole nervous process recurs exactly as it occurred in perception. For discussion of the question, see ch. xiii., § 5.

accuracy the name and age of the deceased and the mourners at the funeral."

Native retentiveness must be tested by desultory memory—our memory for things which have not a special interest or importance for us. Professor James gives an instance of a friend of his own who "was introduced to a certain colonel at a club. The conversation fell upon the signs of age in man. The colonel challenged him to estimate his age. He looked at him and gave the exact day of his birth, to the wonder of all. But the secret of this accuracy was that, having picked up some days previously an Army register, he had idly turned over its list of names, with dates of birth, graduation, promotions, &c., attached, and when the colonel's name was mentioned to him at the club, these figures, on which he had not bestowed a moment's thought, involuntarily surged up in his mind."[1]

This tendency to repetition in the nervous system has been likened to the law of inertia in the material world. The fundamental law of physics is that motion once initiated continues; and at first sight the law of habit seems so analogous to this, that to some philosophers the difficulty has been to account for forgetfulness, not for memory. Enough instances of wonderful recoveries of memory have been recorded to make the hypothesis that we really never forget tenable. Thus De Quincey tells us that in his opium dreams "the minutest incidents of childhood or forgotten scenes of later years were often revived. I could not be said to recollect them; for if I had been told of them when waking, I should not have been able to acknowledge them as parts of my past experience. But, placed as they were before me, in dreams like intuitions, and clothed in all their evanescent circumstances and accompanying feelings,

[1] James, *Principles of Psychology*, vol. i. p. 661.

I recognised them instantaneously." Indeed, we all know only too well that we cannot always command our knowledge; we are often aware that a certain name or phrase is really in our memory, although we cannot produce it at the moment.

But the analogy on which the theory is based does not really exist. For while changelessness rules in the inorganic, the principle expressed throughout the organic world, as we know it, is that of growth or development, and decay; of birth and death. No doubt every experience produces an effect on the organism rendering it actually different from what it was before; but the common belief that many of these experiences pass in time beyond the reach of conscious recall is probably correct. In other words, forgetting is a reality.

We must not think of memory as storing up an infinite number of separate ideas, or even of complete experiences. Each hour of our life has an influence on us and alters us, but for this causal action it is not necessary that any particular perception should survive in its individual distinctness. What we have are rather *functions* or *modes of action* which may occur in the most various combinations; definite facts or incidents are remembered, and definite images persist only so far as they continue to supply us with the working material of an intellectual life—*i.e.*, only so far as we continue to use them in fresh combinations.

Our knowledge of any object—of an apple, for instance—seems to us a unity, but in reality it is made up of sight memories, smell memories, taste memories, touch memories; and if any of these branches of memory were destroyed then our concept would be so much the poorer. Thus each of the sensory centres appears to possess its own memory, and it is matter of common knowledge that in the same individual these memories

may vary much, both in tenacity and vividness. T
we may have a good memory for sights and a bad
for sounds; a good colour memory and a bad one
form; a good memory for figures and a bad one
names. In this region individual differences are gr
as Mr Galton has shown; but almost invariably
visual and auditory memories are stronger than th
of the other senses.

Certain experiments seem to suggest that, in so
people at least, improvement in retention may
brought about by practice.[1] On the other hand, P
fessor James believed that retention is dependent on
original constitution of the brain, nor did he think t
this fundamental property can be modified by educati
Improvements in memory he held to be due not to
change in the native power of retention, but to i
provements in method. Thus an actor may le
his part more quickly in age than youth, but this
because he has found out by experience the best way
impress it upon his mind. A linguist learns each su
cessive language more easily than the first, but t
is because his plan of campaign being settled he was
no time at the beginning; and moreover, he has in
mind much which, by its resemblance to the new kn
ledge, makes the process of acquisition easier by actua
lessening the bulk of the new.

Physical conditions certainly do seem to affect
[illegible] reproduction but also that
retention. Fatigue, for example, is unfavourable
retention. Professor Mosso tells us that Alp
climbers have frequently to take notes during th
great ascents, as after their task is over they

[1] McDougall and Smith, "Experiments in Learning and R
tention," *Brit. J. Psych.*, vol. x., 1910.

remember nothing.[1] Sir Richard Burton, the great Eastern linguist, says that in learning a new language he "never worked more than a quarter of an hour at a time, for after that the brain lost its freshness." A friend of our own, a professional elocutionist, tells us that all pieces she has committed to memory when in good health and not fatigued she can reproduce at any moment, but such pieces as have originally been learned when she was tired or run down have to be relearned every time she has occasion to use them.

Retention varies also with the amount of attention we bestow on the original experience. Hence the laws of retention are for the most part identical with those of attention. Thus when any circumstance interests us intensely, it impresses itself quickly and deeply. Browning's "Fra Lippo Lippi" furnishes us with a good example when he explains his gift for life-like portraiture thus:—

"But, mind you, when a boy starves in the streets
Eight years together as my fortune was,
Watching folk's faces to know who will fling
The bit of half-stripped grape-bunch he desires,
And who will curse and kick him for his pains,—
Which gentleman processional and fine,
Holding a candle to the sacrament
Will wink and let him lift a plate and catch
The droppings of the wax to sell again,
Or holloa for the Eight and have him whipped,—
How say I?—nay, which dog bites, which lets drop
His bone from the heap of offal in the street,—
Why soul and sense of him grow sharp alike,
He learns the look of things, and none the less
For admonition from the hunger-pinch."

The more massive an experience is—that is, the more it affects our whole personality—the more likely it is

[1] Mosso, *Fatigue*, Eng. trans., p. 200.

to be retained. In such a case the memories of the different senses come to the aid of each other. Moreover, what is even more important, such an experience is sure to be soon and frequently reproduced, and each reproduction deepens the original impression, and adds to the chance of the memory reappearing in consciousness.

When we *commit* anything *to memory* we usually do so by means of repetition. This may be merely a device for increasing the duration in consciousness of the presentations in question, and so deepening the "traces." This process of "deepening" seems to go on apart from consciousness, so that a pause between successive repetitions or groups of repetition is advantageous. In a series of experiments conducted by Jost,[1] it was found on comparing eight repetitions on each of three successive days with four repetitions on six, and two on twelve, that the efficiencies tested twenty-four hours later were respectively as 11.5, 35, and 54. The experimenter surmises that one repetition on each of twenty-four successive days would give better results still. Here the total number of repetitions is in every case the same; the difference is only in the number of times that what may be called the process of "settling" is allowed to take place—namely, three, six, and twelve times. It is as if the effort to learn generated a certain momentum which causes the mind to go on growing in the same direction even when explicit attention is withdrawn. Some people when tested immediately after learning give a worse reproduction than they do after an interval which may be of considerable length (a week or more).[2] An analogous state of affairs is well known to exist with respect to our

[1] See Ward, *Ency. Brit.*, 10th ed., vol. xxxii. p. 62.

[2] See P. B. Ballard, "Obliviscence and Reminiscence," *Brit. Journ. of Psych., Monograph Supplements*, vol. i.

muscular accomplishments. Professor James has somewhere said that we learn to skate in summer and to swim in winter: this simply means that the skill precariously attained during the season's practice becomes settled and confirmed during the subsequent rest.

If now we tabulate the conditions favourable to retention we find they are as follows:—

1. Freshness of brain (or mind).
2. Amount of attention bestowed on the experience.
3. Massiveness of the experience.
4. Number of times the experience is repeated, or its duration in consciousness.

With respect to this last condition it should be noted that repetition without attention—without a definite set of the mind towards remembering—is curiously ineffective. It may indeed induce a distaste for the material which seems definitely unfavourable to its retention.

§ 3. *Experimental work.*—It is abundantly plain that memory as it occurs in ordinary life is a very complex phenomenon: whether an experience will be retained in memory or not depends often upon the whole previous life-history of the individual concerned. There are certain events, such as births, marriages, deaths, which, trivial to others, rouse in us such hosts of associated thoughts that we could never forget them. The first endeavour of the experimentalists is then to simplify the problem. With this end in view they select material which has few associations: Ebbinghaus, the pioneer in this research, used nonsense-syllables such as nem, pep, taw, &c.; since then musical tones, figures, coloured squares, rays of light of different intensities, have been among the materials employed. Among the aims of the inquirers have been to find out the effects of rhythm, repetition, primacy, recency of the impressions on the memory:

to discover the comparative strengths of the different sense memories; to compare immediate reproduction with reproduction after an interval; to ascertain how the different senses affect one another when used in conjunction, and so on. The following account will serve as an example of the methods used. This investigation was undertaken by Münsterberg at Harvard; the material used was small squares of different colours and similar white squares with black numbers printed on them. These squares were exposed in series of twenty, two seconds being given to each. The subjects were given similar squares and requested to arrange them in the same order as those they had seen. They were cautioned against making associations. The reproduction was immediate. It was found that in the purely visible series the average error was 20.5 per cent; in the audible series, where the colours or numbers were named instead of being shown, the average error rose to 31.6 per cent; when the series was mixed, the material being sometimes shown and sometimes named, the error increased to 39.3 per cent. It would thus seem that to change from one sense to another has a harmful effect upon the memory. When the two senses of sight and hearing are used in conjunction the errors are to those of a purely visible series as 3.9 is to 10.5. Thus the different senses aid one another very considerably when used together.

A great mass of material is being in this way accumulated, from which it may be expected that valuable results will in course of time emerge. A few references to this literature are appended: F. Kennedy, "The Experimental Investigation of Memory," *Psych. Rev.*, vol. v. p. 477 (an examination of the methods and problems, with a useful bibliography); W. G. Smith, "The Place of Repetition in Memory," *Psych. Rev.*, vol. iii. p. 21; L. G. Whitehead, "A Study of Visual

and Aural Memory-Processes, *Psych. Rev.*, vol. iii. p. 258; W. H. Winch, "Immediate Memory in School Children," *Brit. Journ. of Psych.*, vol. i. p. 127, vol. ii. p. 52; James, *Principles of Psych.*, vol. i. pp. 676-679 (an account of the inauguration by Ebbinghaus of these experimental investigations); M. W. Calkins, "Association," *Psych. Rev.*, vol. i. p. 476, vol. ii. p. 32; E. A. Kirkpatrick, "An Experimental Study of Memory," *Psych. Rev.*, vol. i. p. 602; M. W. Calkins, "Short Studies in Memory and Association from the Wellesley College Psychological Laboratory," *Psych. Rev.*, vol. v p. 451; E. A. Kirkpatrick, "Memory and Association," *Psych. Rev.*, vol. v. p. 654. These last three papers form a connected group showing results of very considerable educational suggestiveness. In Dr Burnham's valuable monograph on Memory in the *American Journal of Psychology*, vols. i. and ii., a section is devoted to experimental studies, vol. ii. p. 587.

In the course of his investigations Ebbinghaus showed that the process of forgetting is rapid at first, but falls to a minimum later. Measuring the amount forgotten by the time required to re-learn the series, he found that although half was gone after one hour, eight hours later only two-thirds had disappeared, while later still considerable stretches of time passed in which hardly any decrease could be detected. The swiftness with which forgetting proceeds at first is recognised by our common law, which accepts as evidence such notes as are written down on the spot, but not such as are made immediately after the witness has returned home. Travellers have noted the same thing: thus Dr Johnson in his 'Journey to the Western Isles' says: "An observer deeply impressed by any remarkable spectacle does not suppose that the traces will soon vanish from his mind, and having commonly no great convenience for writing, defers the description to a time of more

leisure and better accommodation. He who has not made the experiment or is not accustomed to require rigorous accuracy from himself, will scarcely believe how much a few hours take from certainty of knowledge and distinctness of imagery; how the succession of objects will be broken, how separate parts will be confused, and how many practical features and discriminations will be found compressed and conglobated into one gross and general idea." This may be one reason why the expression "travellers' tales" has become a byword.

§ 4. *Reproduction: laws of association.*—The existence of retention as a quality of mind or brain is not known directly, it is only deduced from the fact of Reproduction.[1] We have seen that a certain degree of retention is indeed involved in all psychic life; it would be impossible to understand a spoken sentence unless the beginning were still echoing in your mind when the final words are pronounced: similarly, all comparison, judgment, even ordinary perception, evidently involve memory (ch. xi., §§ 3, 4). Thus the "present" time to the human mind is not a mere mathematical point as we conceive when we think of time in the abstract, but is a period of sensible duration including all the experience grasped in one act of attention and feeling. Reproduction proper, however, means the repetition of some presentation after an interval during which that particular presentation has not existed for consciousness at all. Language is apt to be misleading here because we talk of the recurring or repeated presentation as being the "same" as the original one, whereas what we really mean is that the

[1] Cf. what was said above (ch. iii., § 5) concerning "psychological dispositions."

two presentations, which as psychic events are two distinct entities, refer to one and the same object. Thus if you form a memory picture of Ben Nevis as seen from Fort William to-day and also to-morrow, you say you have the same idea both times; your meaning, however, is that you have had two mental pictures, both of which referred to or represented the same object—Ben Nevis. Neglect of this simple and obvious point has caused much confusion in psychology. It may be contended that the cerebral modifications in the two cases are the same, in the sense of being indistinguishable without a reference to time—that is, as first or second. This is very doubtful. The clearest of memory images is continually shifting, as we lay stress first on one part then on another, and it is unlikely that our thoughts, and with them the cerebral changes, should follow exactly the same course twice. Speaking generally, however, we may allow that especially in the simplest cases, as when we image a straight line or remember a proposition of Euclid, the brain changes keep pretty closely to certain established lines.

Apart from such memory images as we have hitherto had in view, there are certain elementary forms of reproduction which have sufficient psychological interest to be considered here. If we open our eyes upon a bright light and immediately close them again we see a white image of the light forming itself upon the field of darkness. This persists for a short time, then disappears, after which it may reappear and again disappear possibly more than once. Then, if the observer still keeps his eyes closed, a dark image of the light may appear and may go through the same fluctuations. The first image has been fitly called an after-sensation, or perhaps more correctly an after-percept; the second is the well known

complementary image. Again, if we have looked long and intently at any object (*e.g.*, the field of the microscope) a vivid representation of it is apt to recur involuntarily even when our thoughts have no reference to it. This has been called the primary memory image. It does not move with the movement of the eyes as the after-sensation does, and is not generally so definitely localised in external space. It is, in fact, a true memory image, deserving to be placed in a class by itself only because of its vividness and persistence. In course of time it fades so as to be indistinguishable from the ordinary memory image.

Ordinary reproduction, after an interval, takes place in accordance with the Law of Similarity or the Law of Contiguity. The Law of Similarity is that the occurrence of any state of mind which resembles a past state tends to bring about a recurrence of that past state. Thus, if we are angry with any one, all the previous injuries he has done us are apt to rise in our minds. Now it is evident that the thought of the present injury can never before have been associated with the thought of any of the other injuries; hence it is at first sight difficult to explain this Law of Similarity in accordance with the accepted law of neural habit. But when we analyse the state we perceive that part of it is *identical* with previous states: in this case the general sense of injury and the thought of the special person guilty have occurred before, and have then been associated with other circumstances, which are now raised by them to consciousness. Hence we may, if we find it helpful, translate these facts into a hypothetical construction of what goes on in the brain cells—we may suggest that a portion of the brain tracts which are now excited has in former states of excitation made part of other definite paths; the present excitement tends to pass along the

same paths, and simultaneously with this the memory of the previous associates rises in consciousness. It is, however, very difficult, if not impossible, to apply this explanation in more subtle cases (see p. 452).

The Law of Contiguity states that when two elements of experience have once been connected by occurring simultaneously or in close succession in consciousness, then the recurrence of the one tends to bring about the recurrence of the other. This statement must not of course be interpreted as meaning that a bond of union is established between *any* two presentations which occur together in consciousness. Generally speaking, it is only when they have been attended to together that they become connected. Occurrences which have not interested us are dropped out. Did the whole state tend to recur, memory instead of being an abstract of experience would become a transcript, and would lose much of its practical usefulness.

If we now compare the analysis of the law of similarity with the statement of that of contiguity, it will appear that the two do not really differ, the revival of similars by similars being in its essence a revival of ideal elements by ideal elements which were once actually associated with them in consciousness. It has been, therefore, proposed to combine these two generalisations into one single law, to be called the law of Redintegration, the purport of which would be that the whole of a mental state tends to be reconstituted when any part of it occurs. The distinction between the two laws, however, though quantitative rather than generic,—the identical element in the two states being obviously much smaller in the case of revival by similars than in the case of revival by contiguity,—is not without its practical use. Thus all analogy, all scientific gen-

eralisations, are instances of the action of the law of similarity; all causal connections, of that of contiguity. Our memory of our past lives depends mainly on associations of contiguity, our forecasts of the future on suggestions by similarity. The more mobile a mind is, the more does its action exemplify the law of similarity; hence children have long been noted for their sensibility to suggestion by similars. Apart from mobility, a fineness of organisation would favour this kind of mental movement, as the elements of the mental states would then be more clearly discriminated. Such a mind will be original, for there seems no end to the similarities that may be discovered if we have only wit enough to perceive them.

§ 5. *Effects of emotion and interest.*—The reinstatement of a previous state is usually gradual, one element summoning up others. Thus re-reading an old letter will wake to life many thoughts and emotions long unfelt. A whole emotional attitude may be thus reinstalled. When an "old boy" revisits his school, the sight of the buildings, the familiar rooms, the well-known face of his old master, sometimes bring back to him in tingling reality the shrinking timidity of his youth: on the other hand, the changes may be so many that by their constant hostility to the process they prevent reinstatement; or, the old self of boyhood may have been left so far behind that, though there is an intellectual memory of the old conditions, it fails altogether to possess consciousness and drive later elements from the field. Hotspur's famous speech descriptive of the trimly dressed lord with his complaint of the soldiers who bring "a slovenly unhandsome corse between the wind and his nobility," is an excellent example of this reinstatement of a previous state of

mind. As his anger again rises at the very thought, every little incident of the conversation comes back to him—though, conveniently enough, fatigue, as he points out, has swept from his remembrance his own share in it.

That this law of reproduction includes emotion among the elements of experience is a fact that is often neglected. And yet emotion is a determining factor of the utmost importance in the movement of experience, for there is a massiveness about it which renders its influence greater than that of almost any of the ideational elements. Each of the latter, moreover, has hundreds of associates, and which of these is brought into consciousness is determined largely by the dominant feeling or mood of the moment. When we are gloomy the stream of thought is darkly tinged, when we are glad it dances in the sunlight.

Again, the dominant interest determines the direction of the flow towards itself. The thoughts which the same landscape arouses in a geologist and in an artist are entirely different.

We have seen that the number of representations or reproductions of a presentation, the recency of its occurrence, its original interest, the length of time during which it occupied the focus of consciousness, are all factors favouring retention. If we talk over and think over our experience we shall have "better memories" than if we live simply in the present, letting each day's life slip from us as the sun goes down. We all know that it is possible to acquire very quickly and thoroughly a considerable body of knowledge—*e.g.*, for an examination or for some legal case—and then to drop this from our mind so completely that a week or a fortnight after there may

be the merest fragments remaining. It is quite otherwise with knowledge in which we have a permanent interest, for we are constantly reviving this either to use it or to add to it, and each reproduction gives it a new lease of life. Knowledge in this way often becomes so strengthened that it rises in our minds spontaneously even when we are otherwise occupied; it establishes itself as a neural habit, thus lending countenance to the Herbartian scheme of presentations which in that limbo below the "threshold" are engaged in ceaseless struggle to rise to the clear light of consciousness.

It has been doubted whether ideas ever do rise thus spontaneously, the suggestion being that there is always some "cue" either in perception or in the preceding thought to bring them up; and indeed we may admit that, apart from the influence of sensations, the direction of our active consciousness seems in most cases to be determined by associations. But even if this were the case universally, the statement must not be interpreted as implying that the mind is passive; on the contrary, as we have just seen, the dominant interest of the mind at the moment determines the particular course of the thought among many possible ones, as when the "swish" of any feminine skirt rouses in Romeo the image of his Juliet—not of his landlady. We ourselves believe, as indicated above, that not only do certain thoughts appear in consciousness on the merest pretence of a cue, but that the slightest pause in the stream of thought acts like the release of a catch which is suppressing these insistent ideas. They surge up in our minds whenever these are temporarily vacant,—*e.g.*, after sleep—we have noticed this occur before our eyes were open,—or when we sit down to rest prepared to "think

of nothing." The reader should examine this point in the light of his own experience. In pathological cases the common "mania of suspicion"—the conviction that one is being plotted against by every one—is a similar example of the hyper-excitation of a psychical disposition causing certain ideas to rise in consciousness without cue.

While the habit of "rubbing one's thoughts together" in idle moments certainly strengthens the bonds of association and increases the chances of reproduction, it tends at the same time to render the mind homogeneous—*i.e.*, to equalise the chances of the principal items of our experience recurring to consciousness. The associations formed by items not worked over appear to be very much stronger, but this is often simply because they are fewer. The sense of smell is often referred to as possessed of extraordinarily strong associative power: with many people a particular scent always calls up a particular condition of mind. Thompson Seton asserts that this is the secret of the Indian medicine-bag; many of the Indians "in time find out the smell that conjures up their happiest hours and keep it by them. . . . It is very real and dear to them—that handful of pine-needles, that lump of rat-musk, or that piece of spruce-gum. It adds the crown of happy memories to their reveries." Now smells are by most people not easily reproduced in memory; for this and for other obvious reasons they are not constantly turned over and over in consciousness and so brought into a network of interconnections as visual images are; hence if a particular smell forms a part of a total state of consciousness which makes a deep impression, the recurrence of the smell sensation will recall that one state and no other.

§ 6. *Types of memory.*—We have already pointed out

that each of the senses has its own memory, and that these memories differ very much in vividness.[1] Mr Galton in the course of his researches has demonstrated that some individuals habitually use one sense memory, some another. He distinguishes a visual, an auditory, and a motor type. The memory for tastes and smells also differs in different individuals, though from the nature of the information we obtain from these senses it is unlikely that there exists an olfactory or a gustatory type. M. Ribot adds to the three above mentioned an affective type, representing a class of persons whose memory for emotional experience is unusually vivid. To illustrate what is meant, we quote a short example from his book, *The Psychology of the Emotions* (Eng. tr.), p. 155.

Case 6: a woman aged 28. "Three years ago I used to go and see a relative who was undergoing treatment at an establishment in the neighbourhood of P——. My visits were very frequent, and always began with a long wait in a room overlooking the garden. If I wish to repeat the impressions of this time of waiting, which was always disagreeable to me, all I have to do is to sit down in a chair, as I was then seated, to close my eyes and put myself in the same frame of mind, which I can do quite easily. Not half a minute passes between the evocation and the clear and absolute reconstruction of the scene. First I feel the carpet under my feet, then I *see* its pattern of red and brown roses; then the table with the books lying on it, their colour and style of binding; then the windows, and through them the branches of the trees, of which I hear the sound as they beat against the glass; lastly, the peculiar atmosphere of the room, its unmistakable smell. After

[1] For examples of the degrees of vividness in images, see under Imagination, ch. xiii., § 2, pp. 4[illegible] ff.

this I feel over again all the weariness of waiting, complicated by an intense dread of the doctor's arrival—a state of apprehension ending in a violent palpitation of the heart which I find it impossible to escape. When once I have entered on this train of thought, I have to follow it out to the end, passing through the whole series of states which I passed through at the time."

In this example appear sight, sound, and smell memories, besides the muscular ones involved in the feeling of weariness, and the organic ones accompanying the reproduction of the original emotional state. Many people cannot represent to themselves their past emotions in this vivid way, though they remember perfectly that they felt fear, anger, love, as the case may be, and the circumstances, such as "cold shivers," trembling, quickened heart-beat, &c., which accompanied these emotions. Most people can and do use all these forms of memory to some extent, though visual images tend to occupy a predominant place. The motor or muscular memory is remarkably tenacious and exact, and plays a more important part in our lives than we are at first apt to imagine.[1] It is almost impossible to forget how to carry out the complexes of co-ordinate movements required for golfing, cycling, or playing tennis, when we have once acquired them. Of this tenacity the following incident is a striking proof: Edith Thomas, a child about nine years old, deaf and blind from her fourth year, "was tested by Professor Graham Bell of Washington as to her ability to reproduce by motor imitation the movements of the throat and mouth involved in articulate speech. She succeeded fairly well,

[1] Muscular memories are habit memories the laws of which are probably different from those of pure memories. For an account of an experimental investigation of this question, see *Brit. J. Psych.*, vol. x., 1920.

pronouncing the letter *k*, which offers peculiar difficulties to deaf mutes, with unusual distinctness. When asked to repeat the letter some hours later, she called with an almost perfect enunciation, Kitty, Kitty, Kitty. Investigation revealed the fact that when at the age of four the gradual loss of speech had followed that of sight and hearing, the last intelligible word spoken by the child was Kitty. The reproduction was unconscious, the child having absolutely no idea of what she had done. It was not, then, a reproduction of the word as heard or as associated with something seen, but a muscular movement which, latent for five years, was recalled by the suggestion of a similar movement."[1] In memorising words most people pronounce them in order to have the advantage of combining motor memories with the visual images. This nascent pronunciation is something very subtle: we find that it can be continued even when for purposes of experiment we pronounce other words aloud. Memories of touch sensations are preserved also, though in most people they fill a very subordinate place. In an American investigation, in which a hundred junior students of psychology were questioned as to their mental imagery, there was found one among their number who declared his images to be mainly tactual. His dreams were exclusively tactual. Numbers were correlated with sensations in the finger-tips; thus the idea of 5 or a multiple of 5 always brought with it a feeling in the tip of the little finger.[2]

There is also an "imageless" type of memory, the

[1] Graham Bell, "Muscular Memory," *Amer. Journ. of Psych.*, 1896.

[2] R. H. Stetson, "Types of Imagination," *Psych. Rev.*, vol. iii. p. 398.

possessor of which readily clothes his memories in words, but does not and often cannot induce them to take visual or auditory form within his mind.

§ 7. *Recognition.*—When memory is at its lowest we cannot call up any image of an experience; but we recognise it as familiar if it occurs again (cf. ch. xi., § 3). We frequently have this sense of familiarity in meeting a person for the second time even before we remember his name or anything definite about the first meeting: sometimes we have it on seeing a person we have never seen before, and in this case we often subsequently discover a likeness in him to some other of our acquaintances. The sense of familiarity appears when we feel that the present conscious experience has associations in our mind which were made on the former occasion of its occurrence, and that these are trembling on the verge of consciousness. We all know this feeling of having something in our mind which we cannot force into consciousness: the sense of what we want is perfectly definite,—it is like a hole which nothing but the right thing will fit; it is not a mere vacuum, it is a shaped vacuum. Try to think of some French equivalent which you *know* but cannot remember, and you will experience the feeling referred to at once. The feeling seems to be an awareness of what we must figuratively call the *movement* of some of those psychological dispositions of which, as we have seen, by far the greater part of our mind at any given moment consists. The belief that a presentation accompanied by this feeling has been experienced before is simply a generalisation; in innumerable cases definite associations have come into consciousness afterwards and been joined to presentations which were originally accompanied only by this feeling of incom-

pleteness; and from an accumulation of these particular instances we have drawn the general conclusion that this feeling is the sign of an experience not wholly new.

The feeling of incompleteness in itself, then, by no means accounts for the feeling of familiarity. The feeling of familiarity, no less than recognition proper, implies that I, who have this experience now, have had a similar one before. It is possible to conceive of the existence of a mind (or say a mental aspect of a brain) which should have conscious experiences, and which might even add to those the results of previous conscious experiences treasured up by means of modifications of brain tracts, and yet have no personal identity; but it is impossible to conceive of such a mind greeting any of its experiences with the words, I have felt this before. It is the fact of recognition which forbids us to dissolve the mind into a mere succession of conscious states; it is on the fact of recognition that our belief in our own continuous existence through time depends.

§ 8. *False Recognition or Paramnesia.*—The possibility of false recognition has been already mentioned. Sometimes it is readily explained as the result of imperfect observation—a dwelling on resemblances and a neglect of differences. In such cases we admit our mistake and readjust with no difficulty. But there is a very common form of false recognition which is much more difficult to explain. The French call it *déjà vu*, or *déjà vécu*. We feel as though we had already lived through what we are now experiencing, although at the same time we are sure we have not. The phenomenon is very common in adolescence, and is sometimes explained by reference to a prophetic dream, or even to a previous existence. Scientific thinkers have put forward various theories to account for it—*e.g.*, (1) delay

in the perceptual process so that the initial sensation is as it were cut off and is taken for an earlier perception; (2) a lessening of attention or of mental grip —the experience has often a dream-like character; (3) an extension of the familiarity-feeling from part or parts of the process to which it legitimately belongs, to others to which it does not legitimately belong.[1] Dr Maudsley and others have suggested that want of accord in the functioning of the two cerebral hemispheres might cause the experience, but in view of our ignorance of the mode in which the hemispheres function in relation to one another, this must be regarded as a pure speculation.

In *La Vie Mentale de l'Adolescent*, Lemaitre gives a number of examples of this experience. Here are two quite typical ones described by a boy of thirteen and a half. "On arriving at L., where I was going to spend my holidays, and where I had never been before, a strange feeling came over me and I said to myself, 'What a queer thing! *I have already seen this place.*' It was the same village, the same aspect. One night, I dreamt that mamma had sent me a message to my aunt's house, and the next day I was amazed when mamma did send me this message using the very words *I had heard in my dream.*"

§ 9. *Memory Image and Percept.*—There are a number of characteristic differences between these two mental processes.

1. Percepts are as a rule more vivid, more insistent than images.

2. Percepts are steadier, more definite, and their

[1] For an interesting discussion of the phenomenon and a personal experience of it explained on the lines of this third hypothesis, see a brief paper by A. Wohlgemuth in *Mind*, July 1924.

§ 10. *Localisation.*—The fourth element which we have noted as distinguishable in a complete act of memory is the localisation of its object in our own past experience. This is necessary in such instances as that described at the beginning of this chapter, which is a type of a large class of facts of memory. There are other large classes in which no such localisation is desired. If we call to mind a particular landscape we image it as a fact existing now, and the date on which we actually saw it is of no interest or importance for us. Similarly, when we repeat passages of poetry we have learned, we do not as a rule care when we learned them. The interest in all such cases is centred in the things themselves, not in the things as having made a part of our lives. Other things there are of which the memories are so engrained in us that they form part of ourselves; in this case also the time element is lost—and, indeed, we do not say we remember such things, we say we know them. Our own language, the letters of the alphabet, the names of most common objects, the facts of solidity and weight, these things we say we remember only when we discover that there is a possibility of forgetting them. Many muscular memories, such as the methods of pronouncing words, are similarly engrained.

In the reinstatement of an experience, suggestion or association is often aided by rational construction. Thus in the propositions of Euclid we partly remember the proof, partly construct it in accordance with certain permanent principles. Our own past lives we sometimes reconstruct in a somewhat similar fashion: thus we may determine the order in which we paid a certain series of visits by a consideration of the positions of the houses visited with respect to one another. Our memory pictures of places we check in the same way. For

instance we may say, I thought there were daffodils in the grass, but that is impossible as the time was August; or, I seem to remember your cousin at that party, but if, as you say, he was in Italy, then I must be mistaken.

This habit of rational construction of the past, combined with the dislike we feel for our own ignorance, accounts for many errors of memory. A recent writer describes an experiment on visual memory thus: "I show a friend, a good visualiser, a striking cartoon. He just glances at the sketch before I remove it, and I then put to him a number of questions as to the details he has observed. It is surprising how often he is right, and it is instructive to note how often he is wrong. He sees three buttons where there is one. He describes the coachman's boots, whereas in the cartoon they are hidden, covered with a rug. Positive error thus enters into his image." Here the visual image does not admit of blanks, and they are filled up in accordance with the average of experience. Every item in the image, as already pointed out, has many associates, and what wonder if it is not always the most recent that enter consciousness. Again, desire modifies our memories just as it guides our imagination—nay, even affects perception itself. Falstaff is not the only person who remembers himself valiant while others commemorate his cowardice. We work over our memories along with the rest of our mental material, and reduce all to some degree of consistency. If we have a firmly-established belief in ourselves as men of valour, any inconveniently hostile memories will be crowded out of existence.

An analysis of memory leads to many practical deductions. One or two may be mentioned on account of their pedagogic interest.

1. In teaching children, the substance of the lesson should

be impressed by as many sense avenues as possible, as each will aid the others. In particular, the muscular memory might be much more largely called into play than it is. Thus, writing in the air, when such things as French accents are being learned; moving the lips when memorising; acting historical scenes, &c., are all devices helpful to children.

2. The lessons should be associated with one another as much as possible, and particularly with the interests the children have outside of school hours. This will ensure their frequent reproduction in consciousness.

3. "Cramming" is a psychologically vicious mode of study; time is not allowed for the knowledge thus acquired to be wrought into the fibres of the mind, therefore it soon sinks into obliviscence. Many examinations are unfortunately still constructed so as to favour this mode of preparation.

4. Educators should recognise that sense memory, or rather sense memories, can be cultivated; and they should endeavour to frame their lessons so that positive encouragement to the practice of forming sense images is given.

§ 11. *Memory of the Emotions.*—We may here advantageously take up the much discussed question of the memory of the emotions. Bain's theory was that the emotions, as such, "have the minimum of revivability; but being always incorporated with the sensations of the higher senses, they share in the superior revivability of sights and sounds." To this Professor James objects that "he fails to point out that the revived sights and sounds may be ideal without ceasing to be distinct; whilst the emotion, to be distinct, must become real again. Professor Bain seems to forget that an 'ideal emotion' and a real emotion prompted by an ideal object are two very different things." Professor Ribot takes up the cudgels for Bain's theory in the following words: "I maintain, on the contrary, that we have here only two different stages of the same thing—the

first ineffectual and abortive, the second complete; and the subject which now occupies us must either have been in a very confused state or very negligently treated, for a clear mind like that of W. James not to have seen that affective memories, like others, aim at becoming actual states of feeling." Ribot's theory of memory is that a perfect act of memory would be one which reproduced the state remembered in its entirety: it would thus, in the case of sense memories, become a hallucination. The case of emotional memory may be regarded as parallel; what Ribot terms "a true or concrete memory for feelings" is a revivification or exact reproduction of the feeling remembered; it may be termed an emotional hallucination—that is, an emotion not roused by anything in our present circumstances but centrally initiated. By what he terms "a false or abstract memory," Ribot means that the circumstances are remembered, together with the nature of the emotional effect they had on us, but that no present revival of the emotion is experienced.

Now the conception of intellectual and emotional memory as thus closely analogous, as phenomena of which the particular instances are found in a series exhibiting all degrees of vividness, from the palest representation of the original experience up to its actual reproduction, is a helpful one and in a sense a true one. But for several reasons it is better to regard the perfect act of memory as that which, while giving a perfectly clear representation of the original experience, yet has in it no element of hallucination. With reference to intellectual memory, these reasons are as follows:—

(1) Memory as an activity of the mind has a much

wider range than perception. Thus when we call up a visual image of a room with which we are well acquainted, we see all four walls at once, a thing which would be impossible in perception. If I shut my eyes I can see the wall in front of me at which I have just been looking, but at the same time I can, if I like, see the wall behind me. This reproduction evidently arises from the "traces" left by many acts of perception, and however vivid it might become, it is not easy to conceive of it passing into a hallucination.

(2) Even if we take a case of memory-reproduction of a single act of perception, there seems to be a real psychological difference between the original experience and its copy, which would prevent the latter becoming a hallucination, however "perfect" it might be. It is difficult to say exactly wherein this difference consists: one element in it is with many people the direction of the attention. Thus I visualise as vividly as I can a monument which I know well: I see its form, the grey stone of which it is made, the path along its side covered with yellow rounded pebbles, the green grass in front, the blue sky beyond, the railings, the balustrade, the street, and countless other details; but though the vision is before my inward eye, it is not before my physical eye, which is filled with rays of light from the wall-paper, and if these succeed in gaining my attention for a moment, then the vision fades. Many people find that they can visualise best with eyes shut. This practice enables them to avoid the distraction of the eye-world in front of them.

(3) It seems probable that physiology will some day be able to draw on the physical side a definite line dividing sensations from memory-reproductions of sen-

sations, and that hallucinations will fall on the sensation side of this line.

When we now turn to the emotional world we find that it is distinguished sharply from the world of the intellect in this respect, that it belongs only to the individual. In a sense we may say that there is no such thing as a hallucination in the emotional world: if you feel in a certain way, that feeling exists for you, and there is no one who can challenge it. But if this emotion belongs to the past—if it is a feeling which the same circumstances would not arouse in you now—then we maintain, as indicated above, that it is akin to a hallucination. One recognises its unreality oneself. A concrete instance will make this clear. If at any time a coveted distinction has been snatched from you by what you considered the unfair conduct of a friend, then so long as you attach value to the distinction, the thought of your loss will bring with it the hot feeling of anger with a bitter sense of injustice: your hands will perhaps clench, your face flush. If this happens frequently you may form a habit, in the shape of a deeply-engrained organic memory. Suppose now your circumstances change, so that for years your loss does not occur to you. Then suddenly you meet the wrong-doer; the whole thing springs to your mind, and with it the emotional manifestation begins. But your values have changed; you no longer mind having lost the distinction; you view your friend's conduct more calmly, perhaps you even begin to think him justified, and you check the emotion at once with a wondering laugh at your own folly. In such cases as these emotion is recognised to belong to the present; it is the expression of our personal attitude towards certain facts. Emotion

is the expression of character; therefore it is impossible that certain emotions should be revived when the character has changed. A good emotional memory in M. Ribot's use of the term would mean a character that was set.

Again, since our emotional attitude is so much the expression of ourselves, the revivability of an emotion depends very much on the mood of the moment. When we are filled with bounding happiness and everything is going well with us, we cannot easily revive a state of depression; but when we are out of spirits it is easy to conjure up our wrongs, and with the thought of them to revive the emotion which originally attended them. This close relation of emotion both to the more permanent self and to the fleeting self of the moment renders it desirable not to press the analogy between intellectual and emotional memory, but to separate the latter altogether from the former as depending upon different laws.

Höffding[1] has a suggestive passage which may be quoted in illustration of the foregoing observations. After observing that only in individual cases "which are almost pathological," the fresh feeling which accompanies the remembrance seems to be the very same as in the original experience, he adds: "Littré mentions a striking example from his own experience. At the age of ten he lost a little sister under specially sad circumstances, and had felt great sorrow about it. 'Mais le chagrin d'un garçon ne dure pas beaucoup.' He always, however, preserved a lively recollection of the event, although the freshness of the pain had gone. Then in old age he felt again suddenly, without any special occasion, the same pain. 'Tout à coup, sans

[1] *Outlines of Psychology*, pp. 241, 242.

que je ne le voulusse ni le cherchasse, par un phénomène d'automnésie affective, ce même évènement s'est répro-duit avec une peine présente non moindre, certes, que celle que j'éprouvais au moment même, et qui alla jusqu'à mouiller mes yeux de larmes.' This was frequently repeated in the course of several days, after which it ceased and gave place to the customary remembrance." This reference to "the customary remembrance" recalls the saying that "sadness departs upon the wings of time." What does this mean in psychological terms? There are two different possibilities: (*a*) we may remember the fact that we have had an emotional experience of such and such a kind (having now no memory-image of the circumstances); or (*b*) a vivid memory-image of the original circumstances arouses a feeling *like* the former one, usually much less intense, and without any element of "hallucination," as when Hotspur's wrath revives as he recounts to the King his encounter with "a certain lord, neat and trimly dress'd" (King Henry IV., pt. i., act. i., sc. iii.). What usually happens is that a memory of type (*b*) becomes gradually transformed into one of type (*a*).

The "memory of feeling" had been the subject of considerable controversy—not without ambiguity of terms—when the first edition of this book was published: see, for example, Ribot's elaborate discussion (*Psychology of the Emotions*, pt. i., ch. xi., p. 140ff.); and Urban, in the *Psychological Review*, vol. viii. (1891), pp. 262, 360, 432. As is pointed out above, the question of the "revival" or "reproduction" of *feeling* depends at bottom on what we mean by "revival" or "reproduction" in the case of *perception* or *ideation*.

§ 12. *Diseases of memory.*—As has been stated, much of our knowledge of memory is derived from the occurrence of certain diseases of memory or amnesias. These are divided by Ribot[1] into General Amnesia and Partial Amnesia. The former may be temporary, periodical, progressive, or congenital. The

[1] *Diseases of Memory* (Intern. Sc. Series).

first of these often begins suddenly and ends suddenly, the periods varying from minutes to years. It is commonly associated with epilepsy, and characterised by mental automatism; that is, the sufferer continues to act naturally and to speak coherently, but when he comes to himself again has no remembrance of what he has done. This temporary amnesia is often the result of an accident or overstrain, and it frequently affects the knowledge of the events immediately preceding that which causes the injury. Here is a curious instance written by a young lady, aged seventeen. "In the spring of last year (1902) while attending the University I became exhausted through overwork. One afternoon when returning home something seemed to snap in my head, and it went whirling. This itself is clear in memory, but how I got home, or what happened in the next three days, or in the whole preceding month, are forgotten. Of course from what has been told me I know now about what did happen, but it is still impersonal as a story. I have no memory of the lessons we studied, and though during the time I was sick and before it I wrote verses constantly, I do not know them now, or recognise them as my own work."[1] The term retroactive is applied to this form of amnesia. Its common occurrence confirms the theory that time is necessary for the organisation of memory.

The term "periodic amnesia" covers those cases of double personality which have aroused so much interest of recent years.[2] Here two sets of organised memories

[1] Quoted from Burnham, "Retroactive Amnesia," *Amer. Jour. of Psych.*, vol. xiv. p. 118.

[2] They may be regarded as relatively independent psycho-physical *dispositions* (ch. iii., § 5). See also ch. xvi., § 5, pp. 457ff.

are evolved relatively independent of one another. Certain deeply engrained memories, such as the power to speak, the power to walk, &c., are, however, common to both.

Progressive amnesia often accompanies old age. In this case, as is well known, recent acquirements perish first, because they are least worked into the fibres of our mind.

Congenital amnesia is found in idiots and imbeciles, but it may co-exist with a phenomenal development of the memory in one particular direction.

Temporary failures of memory of a minor kind are so common in the experience of some people as scarcely to excite remark. The examination amnesia which departs as soon as the student has left the examination hall, the inability to remember a name which besets us at critical moments, the repeated forgetting that an important letter ought to be written—these are examples probably familiar to all our readers. Many of these errors certainly indicate, as Freud maintains, that there is a mental tendency hostile to the willed act; we forget the name of a person who is displeasing to us; or whose name has displeasing associates; we forget an intention which we are not whole-heartedly disposed to carry out; we forget where we have put something that we wish to get rid of.[1] Many other mistakes are due to an imperfect memory being filled out in accordance with the experience of the percipient. Several observers of the same incident will give descriptions of it which are in absolute contradiction one with another. Sometimes the contradiction is only in detail, but at other times it is in a vital matter. Two observers who thus

[1] For examples of this kind of error, see Freud, *Psycho-pathology of Everyday Life.*

contradict one another may be equally positive. It has, indeed, been shown that the subjective experience of certainty has no correlation with actual correctness.

These psychological characteristics of our memory render very difficult the determination of the facts in a Court of Justice. Witnesses of unimpeachable good faith may give testimony of the most conflicting nature. Similarly the historian often finds it impossible to determine the actual course of events. An impressive illustration of this fact is given by Dr Barton in his *Life of Abraham Lincoln*. With reference to the question of when and where Lincoln made his preparation for the Gettysburg address he writes: "Having conversed and corresponded with many men who heard Lincoln at Gettysburg, all of them truthful, as I believe, and most of them far above ordinary intelligence, I am prepared to produce material to prove the following statements: Lincoln made no preparation for the address, but trusted to the inspiration of the occasion; he made no preparation until he reached Gettysburg, and wrote the address the night before its delivery, or on the morning of its delivery; he wrote it on the train; he wrote it in full in Washington and took it with him; he wrote it in full in Washington and inadvertently left it there; he wrote it partly in Washington, partly on the train, partly the night before delivery, and revised it on the morning of the delivery. He delivered the address without notes; he held his notes in his left hand but did not refer to them; he held his notes in his left hand and read them in part, and in part spoke without them; he held the manuscript firmly in both hands, and did not read from it, or read from it in part, or read from it word for word as it was therein written. The address was received without

enthusiasm and left the audience cold and disappointed; it was received in a reverent silence too deep for applause; it was received with feeble and perfunctory applause at the end, but it was the man and not the address that was applauded; it was received with applause in several places and followed by prolonged applause."

On the subjects dealt with in the foregoing chapter, see McDougall, *Outline of Psychology*, ch. x.; Stout, *Manual*, 3rd ed., bk. iv., ch. i., ii., iii. (Images and Ideas, Trains of Ideas, Memory); and especially James, *Principles*, vol. i., ch. xiv., xv., xvi. (Association, Time, Memory), and Ward, *Psychological Principles*, ch. ix. (Memorising, Rhythmising, Reading). Reference should also be made to Professor T. H. Pear's stimulating monograph, *Remembering and Forgetting*; to *The Economy and Training of Memory*, by H. J. Watt; and to Spearman's chapter on Memory, *Nature of Intelligence*, ch. xix.

The ablest treatment of these subjects, on the lines of the "Associationist" tradition, will be found in Bain, *Senses and Intellect*, 4th ed. See also Croom Robertson, *Philosophical Remains*, p. 102ff. The facts which were overlooked or insufficiently emphasised by Bain, are described and analysed by Stout, *Analytic Psychology*, vol. ii., ch. v., vi., vii., viii. (especially ch. vi., "Relative Suggestion"). Sully, in *The Human Mind*, vol. i., ch. ix., gave a careful and moderate re-statement of Associationism, and attempted to reduce the Laws of Association to one principle, Contiguity, of which he says (p. 296): "By this is meant the association of two or more presentations through, or on the ground of, their proximity in time, whether under the form of simultaneity or succession." But on the same page he also says the process of association by the link of Contiguity may be regarded as one of "integration or totalisation," "a reconstitution of what was originally given as a whole by means of a recurrence of some of its parts only." This is the "Redintegration" spoken of above (§ 4). Now, if this second statement is true, it is the essential truth; and mere proximity in time is comparatively unimportant. In this

respect, Professor Stout has made an important advance by expounding the processes of Association on the basis of the principle that "*a* tends to call up *b* in the *same relation* to itself in which they were originally presented" (see especially his *Analytic Psychology*, vol. ii., pp. 52ff.). The dominant part played by the *relation involved* has been analysed and discussed by Spearman, *Nature of Intelligence*, ch. vii. ("Eduction of Correlates") and x. ("Reproduction of Associates and Correlate Eduction"); see also Carveth Read in *Brit. J. Psych.*, vol. iv., 1911, and Wohlgemuth, on "The Directions of Association," *Brit. J. Psych.*, vol. v., 1913.

The important question of the relation of Perceptions to Mental Images is dealt with by Wundt and his school (Titchener, *Outlines of Psychology*; Külpe, Ribot) in a way different from that which is defended in this book. All these writers tend to regard ideational consciousness as "merely a more faint and imperfect reinstatement of perceptual consciousness." The physiological grounds for this view are growing weaker as time goes on, and from the psychological side it seems to be nothing more than a case of a "determination to simplify" *in spite* of the facts.

CHAPTER XIII.

IMAGINATION.

§ 1. *Imagination and memory; forms of imagination.*—Although every one knows the difference between what is meant by Imagination and what is meant by Memory, yet it is by no means easy to express this difference in words. From one point of view, Memory seems simply a subdivision of Imagination,—it is, indeed, sometimes called Reproductive Imagination; from another, Imagination is a product of Memory. "Those who try to be artists," says R. L. Stevenson, "use, time after time, the matter of their recollections, setting and resetting little coloured memories of men and scenes, rigging up (it may be) some especial friend in the attire of a buccaneer, and decreeing armies to manœuvre, or murder to be done, on the playground of their youth. But the memories are a fairy gift which cannot be worn out in using. After a dozen services in various tales, the little sunbright pictures of the past still shine in the mind's eye with not a lineament defaced, not a tint impaired."[1] The more we think of the matter the more clearly do we see that the work of the Imagination is to make a mosaic of memories: it is in the workmanship, in the putting together and arrangement, that the art of the master is recognised; not in the creation, but in the selection of materials. Hence

much that has been said in the last chapter may be carried forward to this; much that will be said in this may be incorporated with the last.

And yet the very fact that the two processes are recognised as two in language and in common thought, forces us to inquire just where the difference lies. Professor James distinguishes them thus: "The phenomena ordinarily ascribed to imagination are those mental pictures of possible sensible experiences, to which the ordinary processes of associative thought give rise. When represented with surroundings concrete enough to constitute a date, these pictures, when they revive, form recollections. . . . When the mental pictures are of data freely combined, and reproducing *no past combination exactly, we have acts of imagination* properly so called."[1] To this we must add that the date constituted is a date in our own lives, and that in many cases it is constituted with the utmost vagueness, and amounts only to a conviction that the present imaginative construction does represent some incident or series of incidents which we have experienced before. Here, then, the entire experience is familiar no less than the separate elements; in imagination the elements are familiar, while the experience as a whole is novel. In memory also we consciously endeavour to reconstruct the past—in a sense our end is in our mind from the beginning; in imagination the end is often not foreshadowed in this way, nor is the sense of effort usually present; the flow of thought is free. At times we impose limits on our imagination, as when we seek to construct visions of the scenes described in a book. Many people do this habitually—some cannot prevent the pictures forming, even if they wish. In reading

[1] *Principles*, vol. ii. pp. 44, 45.

The Mill on the Floss, for instance, they will have a clear picture of Dorlcote Mill and of its situation with regard to the river, the wood where Maggie and Philip walked, the houses of the village, &c. A friend of mine tells me that she dislikes illustrated books, because the pictures interfere with her own ideas of the characters and places. It is a point worth considering, whether children should not always be supplied with at least some books of a strong pictoric interest without actual illustrations in order that their power of visualisation may be encouraged.

From *The Gate of Death* we take the following example of the constructive imagination at work: "In these hot nights my window is left open, and as I lie awake I often wonder what can be the strange sounds I hear,—sighs, far-off cries, noises as though things fell, musical notes, languid boomings. I suppose they all have some explanation, if one only knew. Many of them are probably very minute noises quite close to me, transformed in my restless brain to loud noises very remote. Last night I heard a burst of music—utterly inexplicable. . . . Half the beauty of these sounds consists in the fancy which compares and likens them to other sounds, and then calls up a scene to suit them. The firs in the garden murmur in the breeze of dawn like a falling sea; and then in my mind I see a golden sand, or a rock-cave with gem-like translucent water, emerald green, lapping softly against the precipitous ledges. Or there comes a faint sigh from the garden alleys, and I think of some wandering woodland nymph, sorrowing for she knows not what, with her feet white on the turf, looking mournfully out of her dark eyes."

This effortless play of association is well known to all of us, and is a very enjoyable mode of turning over our

mental treasures. We see that the elements are derived from many different memories, though they are so put together that no remembered whole is constructed. In such cases as the above, doubtless our felt preferences direct the flow of thought more than we are aware, but in deference to the fact that the fancies do seem to "come of themselves," this easy play of the imagination is distinguished as Passive. A great difference is felt between that and Active Imagination, in which we definitely strive (*a*) to picture a scene described, or (*b*) to work out an imaginary situation. These two modes of Active Imagination have been called (*a*) Receptive and (*b*) Creative. The latter may be subdivided again according as our endeavour is (1) towards some intellectual construction, as in writing a story or play, or (2) towards some practical work, as in devising plans for a picnic or making a machine to illustrate perpetual motion, or (3) towards some æsthetic end, as in planning the decoration of a room. These divisions of Imagination (in which we follow Sully) may be tabulated thus:—

Imagination

Passive — Active

Active: Receptive — Creative.

In the long stories told by little children the passive imagination is chiefly exemplified: one idea suggests another, and the tale flows on till an end is brought about, not by the nature of the plot—for there is none—but by the weariness of the small narrator. And yet very early in such tales are marks seen which show that

the mind in and by its own natural process of growth is developing the power of abstract thought. Thus, if a child tells you of a blue horse the conclusion is obvious that he is abstracting the quality blueness from the various objects wherein he has seen it, and, dissociating "horse" from its usual colours, is combining in his mind the "free" ideas he has thus possessed himself of. Thus "passive" imagination presupposes a high degree of mental activity in isolating or freeing ideas and recombining them in new forms. In the process of freeing his ideas the child is much helped by the conversation of those around him; he seizes upon new words and applies them vigorously, until by a process of selection and exclusion he finds out exactly what things they fit.

The definition of the qualities thus abstracted is intensely difficult; it is only because the mind of the child leaps out to meet your meaning that it is possible to make him understand at all. It is the recognition of this fact that has caused educators to postpone the teaching of such abstract subjects as grammar to an age when the mind may be supposed to have reached by its own growth the requisite stage of development.

Receptive imagination is possible to the child only when his experience has contained the elements of which you wish him to make use. When it is a question of degree, however, it is possible for his imagination to transcend his experience—so much so sometimes that the reality when he comes to know it is disappointing. Thus a child brought up in the lowlands can imagine mountains by adding height to the low hills that he is acquainted with; though I have heard of a child who, being brought up in a flat country, declined altogether to believe in the existence of the Alps.

Of the forms of creative imagination the easiest is

that which is directed towards some practical end, because here the attention is turned upon objects of sense. Toys — especially simple adaptable toys — are great helps towards the development of this form of imagination. Making verses appears as an early pursuit of some children, the rhyme and the rhythm being to them sensible objects.

It must, of course, be clearly understood that in real life the forms of imagination do not exist thus sharply differentiated; on the contrary, they shade imperceptibly into one another, and may frequently all be found exemplified in a single imaginative process.

§ 2. *Types of imagination.*—Apart from these general classes, examples of which occur every day in all of us, there are *types* of imagination just as there are of memory—*i.e.*, individuals vary as to the sense terms in which they habitually represent the incidents they imagine, and within these types there is every gradation of vividness. The special sense terms we habitually make use of we treat as symbols only; we *mean* by them not only themselves but others associated with them in sense experience, and by voluntary effort we may bring these others actually into our minds. Thus the writer of the lines quoted on p. 392 might no doubt by dwelling upon his vision of the sea have raised tactual memories of the cool slipping of the water through his fingers, and motor memories of its resistance as he pushed his way through it. Taste and smell associations might also be roused, and no doubt, although it is not so stated, the whole experience was accompanied by an organic tone appropriate to it.

Of the different senses, the imagery of sight, being predominant with most people and lending itself most easily to clear description, has been most studied. Mr

Galton seems to have been the first in this country to realise the enormous differences in the degree to which individuals possess this faculty. So great are they that although we all habitually talk in terms of visual imagery, yet some of us do so just as a blind man uses the terms of his seeing brother. One or two statements quoted from the works[1] mentioned below will enable the reader thoroughly to realise these differences.

1. "It is only by a figure of speech that I can describe my recollection of a scene as a 'mental image,' which I can see with my 'mind's eye.' I do not see it . . . any more than a man sees the thousand lines of Sophocles, which under due pressure he is ready to repeat. The memory possesses it, &c."—Galton, p. 85.

2. "I can see my breakfast-table or any equally familiar thing with my mind's eye quite as well in all particulars as I can do if the reality is before me."—Galton, p. 90.

3. "I am unable to form in my mind's eye any visual likeness of the table whatever. After many trials I can get only a hazy surface, with nothing on it or about it. I can see no variety in colour and no positive limitations in extent, while I cannot see what I see well enough to determine its position in respect to my eye, or to endow it with any quality of size. I am in the same position as to the word dog. I cannot see it in my mind's eye at all; and so cannot tell if I should have to run my eye along it if I did see it."—James, *op. cit.*, vol. ii. p. 57.

4. "There is very little limitation to the extent of

[1] Galton, *Inquiries into Human Faculty*. Very full extracts are given by Professor James in his *Principles of Psychology*, vol. ii., chap. xviii.

my images: I can see all four sides of a room. I can see all four sides of two, three, four, even more rooms, with such distinctness that if you should ask me what was in any particular place in any one, or ask me to count the chairs, &c., I could do it without the least hesitation. The more I learn by heart the more clearly do I see images of my pages. Even before I can recite the lines I see them so that I could give them very slowly word for word, but my mind is so occupied in looking at my printed image that I have no idea of what I am saying, of the sense of it, &c. When I first found myself doing this I used to think it was merely because I knew the lines imperfectly; but I have quite convinced myself that I really do see an image. The strongest proof that such is really the fact is, I think, the following:—

"I can look down the mentally seen page and see the words that commence all the lines, and from any one of these words I can continue the line. I find this much easier to do if the words begin in a straight line than if there are breaks."—James, *op. cit.*, vol. ii. p. 57.

In the investigation referred to on p. 408, it was found that of the hundred persons examined as to their habitual forms of imagery, 82 pronounced themselves mainly visual, 6 auditive, 4 motor, 1 tactual, 5 equally visual and auditive, 2 equally visual and motor. Such a concept as *riding-a-wheel* was largely represented by distinct feelings of motion in the legs or in the whole body, as in mounting.

Ribot found that of the sixty persons he examined with respect to taste and smell images, 40 per cent had no such images, 48 per cent had some, 12 per cent could call up all, or nearly all, at pleasure.[1] These

[1] *Psychology of the Emotions*, pt. i., ch. xi.

images are nowadays of comparatively little practical use and it is quite possible that they are present in some faint degree more often than is recognised by their owners: thus when we think steadily of salt with a view to calling up its taste, the resulting state of mind—even when no vivid image arises—is quite different from the one we produce when we think steadily of sugar. Indeed, the fact that we *recognise* tastes when we meet them, proves that some modification corresponding to a memory image is present in us, even when we cannot call up at will anything approximating in vividness to the actual sensation. It has been proved by many experimenters that the power of visualising can be greatly improved by practice, and it is probable that similar effects might be produced in the other sense memories.

Kinæsthetic images of words play an enormously large part in many people's thinking. So largely do these images bulk, that although we know that conceptual thinking must underlie and determine the flow, it sometimes seems as if introspection could detect nothing in consciousness save this steady verbal procession. One evening, after using the typewriter for some hours during the day, I found myself, to my amazement, accompanying my thinking, after I went to bed, with distinct images of the finger movements necessary for the use of the instrument. Probably somewhat similar images accompany the thinking of some deaf mutes.

This leads us to ask whether there is a form of imagination[1] which does not involve any sensory images at all. The most promising field in which to look for such a phenomenon would be of course in the field of abstract

[1] The word is of course used in its widest sense here, and so includes memory.

thought. Mr Stetson found that the concepts "relation," "classification," "cause and effect," gave rise to images in the minds of about half of the class he examined; these images usually consisted of a motor element, which was often combined with a visual element. Concepts must of course be *associated* with images, because it is out of particular images that the concepts have been formed; hence we should expect that if we dwelt on a concept images would arise. But the question is, Do we grasp the concept by means of the image, or is the understanding of the meaning a distinct stage upon which the formation of the image follows? In a train of abstract thought, where no individual concept is dwelt upon in such a manner as to bring into our consciousness the associated images, is there, as a matter of fact, any succession of such images?

The conceptual imagination—if it exists—should be highly developed in philosophers and men of science, and these men Galton found to be notably poor in the power of forming visual images. But a very common accompaniment of conceptual thinking is sensations of the nascent pronunciation of words; when kinæsthetic images of this kind exist, the memory is not "imageless," seeing that the word "image" in this connection is understood to cover representations in terms of any sense. An extreme instance of this correlation of speech images with conceptual thinking is presented by Professor Stricker, who says:—

"When after my experimental work I proceed to a description, as a rule I reproduce in the first instance only words, which I had already associated with the perception of the various details of the observation whilst the latter was going on. For speech plays in all my observing so important a part that I ordinarily clothe

phenomena in words as fast as I observe them."—James, *Principles*, vol. ii. p. 63.

The word is of course the least misleading image to accompany the concept that we can have, because its implications in comparison with a visual image, for example, are so few. Very imaginative people are entirely unable to rest content with the bare word: some picture, often of a very elaborate nature, flashes up at once to illustrate it. Thus Mr Canton in his delightful book of Children's Sayings reports the following: "When I say my prayers, I always see everything. When I say, 'Deliver us from evil,' I see God going out with a spear to fight Satan; and when I say, 'Forgive us our trespasses,' I see Him with a big rubber cleaning a black board." Similarly the author of *The Gate of Death* already quoted, says: "If I think of cruelty or liberality, I either see a scene which illustrates it, or at all events I recall a personality which possessed or possesses the quality." This liveliness of the visual imagination is obviously a stumbling-block in the way of abstract thinking, for details in the image which are wholly unessential to the concept may distract the attention from those that are essential. On the other hand, there is no doubt that those people who have lost the use of "that inward eye, which is the bliss of solitude," have lost with it one of the highest and purest pleasures of life.

The association of a concept with the word which represents it is very close. We sometimes feel that we have an idea of relationship, or some abstract notions as it were, stirring in our minds which we cannot express in speech. But we feel also that this knowledge is in high degree vague, and it does not become clear even to ourselves until we crystallise it into words. Again, when we

seek to reproduce the substance of a somewhat abstract book—one in connection with which we formed no sense images—we do not reproduce the words in which we received it; we reproduce the ideas in new words; and this particular chain of words, which have not before been connected together in this form, must owe their connection to that of the concepts, which thus have an existence prior to them.

This whole question is rendered clearer and less abstract by a consideration of it from the physiological point of view. We have seen already that the work of the brain is highly specialised; the speech centres, we have seen, are four in number, and these speech centres—or the area where modifications capable of giving rise to word images have been formed—are not thought to be the storehouse of the "ideas" belonging to the words. Many physiologists think that this storehouse is in the frontal lobe; that is, that it is by the work of the frontal lobe that concepts are formed, and that it is by means of modifications of the frontal lobe that they are preserved. If this be the case, then the frontal lobes are, as it were, the central office of the brain, and any excitement in them may spread to any one of the sensory areas: if, however, the activity begins in one of the sensory centres, then its transmission is limited to certain defined areas of the cortex, unless by attaining to the frontal lobe it gains access to the enormous number of pathways that there converge.[1] If we express the same thing in psychological language, we should say the thought of an abstract concept or of some intellectual synthesis may call up in our mind any one of the host of sensory images from which the concept has been constructed; but although all these individual

[1] Cf. Bianchi, *Text-Book of Psychiatry* (Eng. tr.), pp. 252-254.

images are thus brought together in the concept, any one of them could not directly suggest any other, but only indirectly by first suggesting the concept.[1]

As an illustration of what has just been said, consider this metaphor from the Biglow Papers:—

> "We begin to think it nater
> To take sarse and not be riled;
> Who'd expect to see a tater
> All on eend at bein' biled?"

There cannot be any direct connection between the first two lines of this verse and the last two; the connection is in the concept, "suffering ill-treatment without remonstrance." In all figurative language there is this conceptual link, of which the physical aspect is the passage of the nervous disturbance through the supra-sensory or "higher" centres of the brain. In these cases the conceptual link is hardly ever clothed in words —that is, the track connecting it with the speech centre is not traversed; nevertheless it is present in thought in so far as it acts as a bridge rendering possible the passage from one image or idea to the other.

This imaging of the process of thought in terms of brain centres and paths gives us at least an illuminative illustration—illuminative, because so concrete—of the manner of our thinking. And it does not seem clear why, if we can have a succession of visual images, say, apart from their associates, we should not be able to have a succession of concepts apart from their associates. Many psychologists, however, consider that the concept cannot be evoked apart from the verbal image; and, as we pointed out above, introspection finds it very difficult to

[1] Any telephonic system with its central office affords a perfectly sound analogy.

pronounce absolutely upon the nature of what does exist along with the word.

Considerable discussion has taken place on the relation between image and meaning. The available evidence suggests that in some cases understanding may come through an image which flashes up automatically at the sound or sight of a word, while in others understanding comes first and then embodies itself in an image. Also it can now not be doubted that there are people who at times think without the aid of images at all (see ch. xiv. below).

In connection with the types of imagery, it is perhaps well to mention the curious associations that some people have in imaging: thus letters or sounds may be associated with colours; a friend of my own tells me that a page of print is to her full of colour, all the *i*'s being red, the *s*'s yellow, the *g*'s greenish, &c. Numbers, the days of the week, and the months are sometimes associated with visual schemes, so that a particular number always has a particular position. Pictures of these forms have been published by Mr Galton. These associations seem to be, however, only individual peculiarities, so that we must not allow them to detain us here.[1]

§ 3. *Images on the field of darkness.* — Recent researches into visual images seem to indicate the existence of two classes of them between which such a sharp line of distinction can be drawn that they may be said to differ in kind. In the *Psychological Review*, vol. i. p. 351, Professor Ladd published a short paper entitled "Direct Control of the Retinal Field." He attempted, his eyes being shut, to call up forms on the

[1] Galton, *Inquiries into Human Faculty*, pp. 114ff.; Myers, "Synæsthesia," *Brit. J. Psych.*

field of darkness then before him. "I was soon able," he says, "by attentive willing, to cause a cross or a circle, or two concentric circles, to appear on the retinal field." He induced sixteen other people, all trained observers, to experiment in the same direction. Of these, four reported no success, nine partial, while three were soon able to produce images and to colour them at will. In one case, when the eyes were focussed on white paper after the experiment, a cross of complementary colour was obtained.

The visual images which Meyer describes (quoted by James, *op. cit.*, vol. ii. p. 66) seem to belong to this class. He carried on his experiments with closed eyes, and at first found it very difficult to get any results; later his endeavours succeeded so easily, he says, "that I am surprised they did not do so at first, and I feel as though they ought to succeed with every one." He, too, obtained the after-image. "Most of these subjective appearances," he says, "especially when they were bright, left after-images behind them when the eyes were quickly opened during their presence. For example, I thought of a silver stirrup, and after I had looked at it awhile, I opened my eyes, and for a long time afterwards saw its after-image."

Many of the instances given by Mr Galton in his paper on "Visionaries"[1] seem similar to those here considered. I quote an interesting description of a "vision" which was received from Mrs Haweis:—

"All my life long I have had one very constantly recurring vision, a sight which came whenever it was dark or darkish, in bed or otherwise. It is a flight of pink roses floating in a mass from left to right, and this cloud or mass of roses is presently effaced by a

[1] Galton, *Inquiries into Human Faculty*, pp. 155-177.

flight of 'sparks' or gold speckles across them. The sparks totter or vibrate from left to right, but they fly distinctly upwards, they are like tiny blocks, half gold, half black, rather symmetrically placed behind each other, and they are always in a hurry to efface the roses; sometimes they have come at my call, sometimes by surprise, but they are always equally pleasing. What interests me most is that, when a child under nine, the flight of roses was light, slow, soft, close to my eyes, roses so large and brilliant and palpable that I tried to touch them; the *scent* was overpowering, the petals perfect, with leaves peeping here and there, texture and motion all natural. They would stay a long time before the sparks came, and they occupied a large area in black space. Then the sparks came slowly flying, and generally, not always, effaced the roses at once, and every effort to retain the roses failed. Since an early age the flight of roses has annually grown smaller, swifter, and farther off, till by the time I was grown up my vision had become a speck, so instantaneous that I had hardly time to realise that it was there before the fading sparks showed that it was past."

Ribot in his *Diseases of Memory* states that Wundt can think of a colour so vividly that he obtains subsequently the complementary colour. Binet in his *Psychology of Reasoning* says that his colleague, Dr Charles Féré, is able to perform this experiment successfully, while he himself always fails; his failure he attributes to the fact that he is a poor visualiser. These writers assume that these are ordinary visual images; we believe, from the fact that complementary colours were obtained, that they were images on the field of darkness—or possibly projected into perceptual

space;[1] and we maintain that ordinary visual images are not so placed.

Our reasons are as follows:—

We have questioned several excellent visualisers, and their experience agrees with our own—that images do not exist in perceived space, but in a space of their own, which is not related to perceived space; we ourselves, in a sense, exist in this imagined space, for we can locate the images with reference to ourselves—*i.e.*, above us or below us, in front of us or behind us, but no object of the perceived world exists in it.

We have requested the same friends to attempt to form images on the field of darkness. Uniform failure has been the result.

We have requested them to image a coloured cross as vividly as possible, and thereafter to open their eyes suddenly on a sheet of white paper. No result followed, and this in spite of the fact that one of these subjects visualises so vividly that she habitually paints from her images; moreover, she expected to obtain some form on the paper.

We have ourselves experimented in the same directions. Our results tend to show that one of the writers of this book—who is a *good visualiser*—obtains this special kind of visual image rarely, and with great difficulty; the other writer, who is a *bad visualiser* (especially for *colours*), obtains such visual images (brilliantly coloured) frequently and with comparative ease, and has been able to establish a certain degree of voluntary control over them. The most striking case of an after-sensation in connection with such an image is stated as follows: "Recently, lying half-awake but with eyes shut, I saw an intensely vivid image of a face

[1] This conjecture of ours has been confirmed by recent work on the so-called "Eidetic Image" (see p. 444).

of an old woman, a very pleasant face, except that the eyes were so bright as to be repulsive. It lasted about two seconds, leaving a distinct negative after-sensation of the eyes—two dark spots, my own eyes being still closed." The results further bring out a fact of conclusive significance as regards the difference between these visual forms and ordinary mental images: these visual forms may themselves give rise to ordinary visual memory-images just as percepts do. The writer can recall numerous memory-images of such visual appearances.[1]

We consider, then, that these images on the field of darkness must be placed in a class by themselves, being more nearly akin to hallucinations than to ordinary visual images. The point is one which requires further observation and experiment.

When we turn to the other senses we find interesting analogies. Thus some people are able to produce a sensation on any part of the skin they select. With reference to this Meyer's statement is as follows: "On the skin I easily succeed in bringing out suggested sensations wherever I will. But because it is necessary to protract the mental effort, I can only awake such sensations as are in their nature prolonged, as warmth, cold, pressure. Fleeting sensations, as those of a prick, a cut, a blow, &c., I am unable to call up, because I cannot imagine them *ex abrupto* with the requisite intensity. The sensations of the former order I can

[1] The following is a case of the appearance of colours. "On a night railway journey, when it was impossible to sleep, I noticed coloured patterns forming themselves before my closed eyes: the colours were quite distinct, and were arranged in bunches, so to speak, while wavy lines connected the different bunches. I could not detain the patterns; each stayed a very short time, and then changed into another."

excite upon any part of the skin; and they may become so lively that, whether I will or not, I have to pass my hand over the place, just as if it were a real impression on the skin."[1]

In the case of smell and taste, many of the instances of revival which M. Ribot has collected appear to be quite comparable to the actual sensations. Here is one answer to the question, "Can you perceive, here and now, the scent of roses, and, if so, of what kind?" "I perceive it *in genere;* but, on further persevering, I find it to be the scent of withered roses. The visual representation occurs afterwards."[2] Notice also the *scent* which accompanied Mrs Haweis's vision of roses.

Vivid auditory images are by no means uncommon. The "voices" of Joan of Arc are not an isolated phenomenon in history. Many students, when going over their notes, seem to hear the voice of the professor as he delivered them.

The visual images considered in this paragraph seem to be the same as those investigated by the Marburg school of psychologists and named by them "eidetic images."[3] These investigators regard the phenomenon as belonging peculiarly to the field of child psychology. Inquiries by one of the writers seem to show that it is quite common among adults.

§ 4. *Hallucinations and illusions.*—It is evident that images of this extremely vivid nature, when they are projected, as in the case of Joan of Arc, into the spatial world of perception, are almost, or quite, indistinguishable from hallucinations. A hallucination is defined as

[1] James, *Principles of Psychology*, vol. ii. p. 66.

[2] Ribot, *Psychology of the Emotions*, pp. 145, 146.

[3] See *Brit. J. of Psy.*, Oct. 1924, "Eidetic Imagery," by G. W. Allport; also same journal, July 1926, for a paper on the subject by one of the present writers.

a subjective perception; that is, it is a perception produced by a process occurring in the subject and not by any external object. Isolated instances of hallucinations are not uncommon in normal individuals: while the literature of insanity simply abounds in them. They may arise in any sense, but vision and hearing are probably the arch-sinners. They sometimes affect conduct to an extraordinary degree, as is shown by the following example:—

A Sicilian shoemaker "was offended by a lady, who called him a drunkard. Indignant at this he hurled abuses at the lady in return, and she thought it well to avenge herself by referring the matter to four local peasants, of whom he was so much afraid that he remained hidden in his own house for three days. One of these nights the devil appeared to him in a dream and said: 'Take your choice; either cut off your right hand or be murdered by the four men.' In order not to lose his life and soul, he thought, still dreaming, that he would content himself to live minus one hand; then, having awakened, he continued to see the devil beside him, enjoining him to cut off his hand. Terrified by the vision, he was uncertain whether to execute the order or not, either through the inhibition produced by fear or on account of the pain he would have to suffer. He raised an objection to the diabolical vision, from which he received a further injunction, with the assurance that he would suffer no pain. It was then that he gave a look to an old saw, 'and, aided by the devil himself,' to use his own words, he sawed off his hand without feeling any pain, for his arm seemed 'as though made of wood.' As soon as he had completed the mutilation of his hand he felt pain, and, terrified by the amount of blood he was losing, attracted attention by his loud shrieks."[1]

[1] *Text-Book of Psychiatry*, Bianchi (Eng. trans.), p. 211.

It is customary to distinguish from hallucinations *Illusions*, which may be defined as false interpretations of sense stimuli; in this case there is an actual sense basis, but the mind constructs on this basis a percept which does not correspond to reality. These misinterpretations are frequent enough in the experience of all of us. I append an example from my notebook.

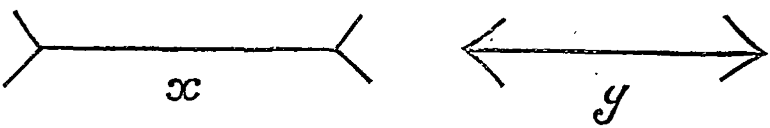
Coming home recently I saw a hansom with two horses drive across my path. I had time to think "surely a hansom and pair is a novelty," before I saw that there was only one dark-brown and white horse; the white appeared very strongly along the ridge of the backbone, and looked like a second horse on the far side. Only after the sound called my attention to itself by stopping, did it flash into my mind that I might have *heard* there were not two horses.[1]

This example illustrates the hesitation of the judgment which, as it were, telegraphs down to the eye, "Don't understand. Report again," and also the possible correction of the error by another sense.

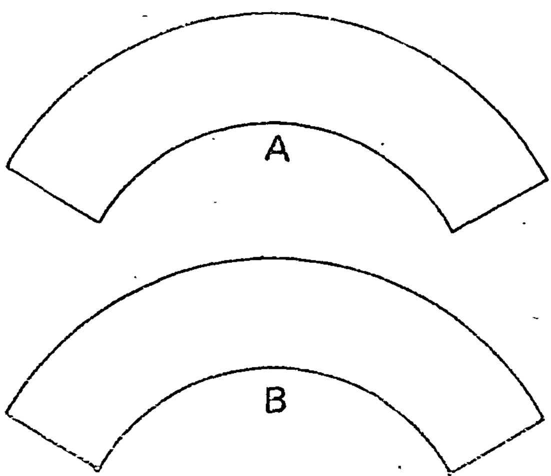
Such illusions are highly individual, and are determined by factors peculiar to the individual. There are, however, certain illusions which are found universally, and therefore present a problem of general psychological interest. Some of them may be explained as due to

[1] The student is strongly advised, while he is studying psychology, to keep a record of his own mental processes. Instances of the different sense-images, of errors in memory, of difficulties in recollection, of illusions, processes of creative imagination, of day-dreaming, of association, &c., occur every day; and if these are noted down, a mass of material will soon be accumulated which will be of the utmost value in lending interest and life to the subject. In America many students have kept records of their dreams in order to see what sense-memories appear in them.

fixity of interpretation, custom, or habit, as the (tactual) perception of *two* pencils which we sometimes obtain when we cross the second finger over the first, and move a pencil to and fro between the finger tips; others arise from stress of attention or expectation—*e.g.*, the false judgment of weight given when we handle boxes of equal weight but of different size; others again are the product of spontaneous sensations arising within the organism—*e.g.*, a subjective ringing in the ears. Then again there is a large variety of normal spatial illusions; *e.g.*, the "Müller-Lyer illusion" (x and y are equal in length but x appears longer):



or the illusion which makes us regard the upper of the two equal figures, A and B, as smaller than the lower:



Some of the illusions here referred to are certainly acquired ways of perceiving. Very young children and defective children, for example, are much less subject to the size-weight illusion than older children. On the other hand, evidence has been brought to show that such a lowly creature as a hen is subject to certain of the normal human illusions with respect to size.

For discussion of some of the spatial illusions, see James, *Principles*, vol. ii. pp. 85ff., 243ff.; and Myers, *Text-Book of Experimental Psychology*, vol. i., ch. xxii.; Révész, "Experiments on Animal Space-perception," *Brit. J. Psych.*, April 1924.

§ 5. *Physiological Processes attending Imagination and Perception.*—If psycho-physical parallelism holds for the imaginative or thought processes, it is obvious that there must be some physiological differences corresponding to the mental differences between imagination and perception. We proceed, then, to ask ourselves, What are these differences in cerebral activity?

We have said it is obvious that such differences must exist, but to some psychologists it is the very opposite statement that has been the obvious assumption. Thus Bain says: "The renewed feeling" (*i.e.*, the image, as we have called it) "occupies the very same parts and in the very same manner as the original feeling, and no other parts and in no other assignable manner." Ribot adopts this theory, with scarcely any discussion, in his *Diseases of Memory*; in his *Psychology of the Emotions* he works out a theory of memory of feelings, which he generalises in this way: "The ideal of every recollection is that, while keeping its character of being

already experienced, it should be adequate in such measure as was possible for the original impression. The revival of impressions is an internal operation, whose extreme form is hallucination."

To every writer who holds to the belief that the seat of sensation and imagination is the same, hallucination must appear as the perfect form of memory; we maintain, on the contrary, that the "perfect" image contains in it no element of hallucination, and that when hallucination does occur it is not a culmination of the normal power of image-making, but a stepping aside from it.

The evidence of the images on the field of darkness seems to show that we can, as Professor Ladd puts it, obtain direct control of the retinal field. Professor James considers that the after-image formed in such cases may be counted as evidence that the nervous current can flow backward down the optic nerve, and, thus affecting the retina, give rise to sensations.[1] He points out that, if this be the case, it forms an exception to all we know of the habits of nerve-currents, which, as we have seen, flow only one way (towards the centre in the case of sensory nerves, towards the muscles in the case of motor nerves). It seems, however, more consistent with our other knowledge to suppose that in such experiments the retina is unaffected, but that the cells of the cortex, below which no consciousness arises, are by central initiation induced to function as they would in the case of a percept produced by retinal excitement. Another hypothesis is that these forms are due to a concentration of the attention on certain of those floating specks which can by many people be distinguished on the field of darkness. This theory is

[1] *Principles*, vol. ii. pp. 70, 71.

indeed supported by a certain amount of evidence, and may, in many cases, be the true explanation both of these forms and hallucinations.[1] Bianchi says: "I have observed a gentleman, well known in high commercial circles, who, after a hæmorrhage into the retina, became the subject of visual hallucinations (persons, animals), of which he always took exact account, and which gradually disappeared in proportion as the extravasated blood became absorbed. In general, however, the artificial irritations of the peripheral nervous expansions reproduce not exactly the concrete images of objects, persons, and places, but elementary phenomena of the same sensation. If we press the ocular bulb in the dark, or stimulate the optic nerve with electricity, we see flashes of light, circles, discs, and similar phenomena. Excitations of the acoustic nerve provoke tinklings, whistlings, and noises, as when the acoustic nerve is stimulated with the electric current."[2] Such cases seem more akin to illusions than to hallucinations proper. The question whether the end organs are called into play is, however, evidently a physiological question of fact, and as such we leave it to the expert in that department. Let us suppose simply (a supposition which is unaffected by the question of the end organs) that the cortical cells which function in hallucination are the same as those which function in perception, and that they function in the same way—that is, that hallucination and perception are, from the point of view of the cortical neurones, indistinguishable.

Now is the physiological distinction between perception and imagination proper (*i.e.*, exclusive of hallucina-

[1] Cf. an interesting paper by G. Dawes Hicks in *Brit. Jour. Psych.*, Oct. 1924, in which he maintains that all imagining takes place by the aid of a nucleus of perceived fact.

[2] Bianchi, *Text-Book of Psychiatry*, p. 215.

tion) simply this: that the cells function "more faintly" in the latter case, but are identically the same? If this hypothesis were true, that the difference is one of degree only—then it would appear that the brightest of images should seem just about to pass over into the faintest of sensations, and, on the other hand, if we fix our attention on a very faint sensation, our feeling ought to be that if it became one degree more faint we should have, not a faint sensation, but a brilliant image. These logical extensions of the theory do not seem to us to tally with the facts of the mind, where the difference, as we have already urged, is one of kind, not of degree.

Let us now take the hierarchical conception of the brain—a theory on which we have already laid much stress—and see whether with its aid we cannot evolve a hypothesis which, if not yet a demonstrable truth, is, nevertheless, in accord with the tendencies of physiological thought at the present day, and which will present a true symbol of the psychic side of the phenomena considered.

A perception consists of (*a*) a sensation element and (*b*) a memory element. If we see a chair the sensation element derived from the excitation of the retina combines with memory elements derived from former tactual and muscular sensations which give the ideas of solidity, hardness, softness, &c.

If we hear the sound of the bagpipes, an auditory element derived from this sensation combines with memory images of sight, &c., so that we have a percept of a Highlander with his instrument marching up and down. (The word percept is usually confined to those experiences which have their basis in the sense of sight or touch, but this seems merely a question of where we are in the habit of laying the emphasis.) Let us suppose that this combination can take place only when the function-

ing of the cortical cells which are brought into action by the peripheral sense organ is "reflected" on a higher level, and that it is on this higher level that the actual combination takes place. Let us call the cells which are stimulated immediately from the periphery cells of level A, and those which combine in the formation of a percept cells of level B. In every percept some cells of level A will function whether in the kinæsthetic, visual, or auditory area, and along with these will function cells of level B of the same and of other areas; when the cells of level B function without any of level A we have a memory-image. In hallucination and the like phenomena some of the cells of level A also are centrally excited, but this is exceptional and abnormal.

This conception can be carried further in this wise: When we form generic images a further reflection to a higher level and elaboration there takes place; when we form concepts a higher level still is called into play. This is of course only a schematic presentation; what actually takes place must be infinitely more complicated than is here suggested; but this scheme at least gives us, as it were, a working model which is helpful in rendering our conceptions clear to ourselves.

If the student is interested in this question, the following references will be found useful :—

James, *Principles of Psychology*, vol. i. pp. 49-51, vol. ii. pp. 72-75.

McDougall, *Physiological Psychology*, "Temple Primers," pp. 85-87.

Bianchi, *Text-Book of Psychiatry* (Eng. trans.), part ii., ch. i., "Physio-Pathology of Perception," and ch. iii., "Physio-Pathology of Memory."

Tanzi, *Text-Book of Mental Diseases* (Eng. trans.), ch. i.

Bergson, *Matter and Memory*.

§ 6. *Limitations and dangers of the imagination.*—

Imagination we have already seen to be dependent on experience. We cannot, for instance, imagine a sensation entirely new to us—one which does not belong to any of the sense types we know: thus a man blind from birth cannot form any idea of what visual sensations are like. We cannot *create* even in terms of those senses with which we are familiar; thus, we cannot imagine an entirely new colour or new sound, one which contains in it no reminiscence whatever of the colours or sounds we have experienced. There are also individual differences in the degree to which we can dissociate and recombine the elements of our experience. Thus some people cannot imagine colour without texture: some have a difficulty in combining elements that have never been combined in perception; for example, it is not altogether easy to imagine a blue face or an organ sounding like a flute. Such incongruous combinations perhaps occur more readily in dreams, in which there takes place an automatic play of sense-imagery uncontrolled by the judgment. Some people have more power than others to transcend by aid of imagination their own experience. Thus a wealth of sympathy may be offered by a child who certainly does not owe to experience his ability to place himself in the position of the sufferer.

The stream of imaginative thought has a continuity of its own, and often sensations and perceptions are felt as violent and unwelcome interruptors of this continuity. Sometimes when we are very much absorbed in our own thoughts these interruptions even fail to make themselves felt. For a considerable period of time we may relegate the conduct of our own affairs to a species of automatism, while our real life is wrapped up in that depicted in a book. Every one knows the

blank feeling of "having come to an end" when a book of absorbing interest is finished. Sometimes this imaginative life is one which we create for ourselves. Here is a curious example: "Sir James Mackintosh was a man who mixed much in the world and took a forward part in public affairs; but from his youth upwards he led another life of curious reverie. He was the Emperor of Constantinople, his friends were his ministers and generals. In endless day-dreams he saw transacted the history of his empire, he watched the intrigues of his palace, he gave rewards to his faithful servants, and formed alliances with neighbouring Powers."[1] The tendency of such a habit as this is evidently towards a divorce from real life. It also tends to render will-power inefficient, as noted in the following case. "A. B. remembers that as early as the age of eight years he was a dreamer, and says that his day-dreaming has been the happiest part of his life, but that 'it has made it very hard, sometimes next to impossible, to pay attention to anything dull or abstract. All the will-power I can bring to bear only serves to pull my mind back to what it ought to be busy with, instead of keeping it steadily focussed there. If one could dream up to the limit when one ought to dismiss it entirely and attend to the sterner things of life, I think day-dreaming would be a veritable gift from the gods. But it is a curse when the habit becomes so fixed that a man can't pay attention to things which perchance have little natural interest for him.'"[2] The great remedy for a state of affairs like this—when there are symptoms of its occurrence in

[1] E. S. Dallas, *The Gay Science*, vol. i. p. 236.

[2] T. L. Smith, "The Psychology of Day-Dreams," *Amer. Journ. of Psych.*, vol. xv. p. 465.

a child—is handwork of a kind which is not monotonous—that is, which requires attention. Any hobby which necessitates the turning of the mind towards outward things—such as some form of athletic exercise, photography, collecting and mounting specimens, &c.—will prove remedial. A certain amount of day-dreaming is of course only the legitimate exercise of a very valuable power, and frequently the castles we build in this way, when closely associated with our real life, prove sources of inspiration instead of stumbling-blocks.

It appears quite certain that the custom of teaching children in large groups of forty, fifty, or even more, promotes to a dangerous degree the habit of day-dreaming. The brighter children are bored, sometimes confused by too detailed and too lengthy verbal explanations of what is perfectly clear to them without explanation; the dull children are also bored and confused because they have no innate power to grasp for themselves the principles involved, and it is not possible for the teacher to adapt himself to the mental level of each and to respect the rhythm of his attention; hence children of both types seek refuge in the easy and fascinating process of dreaming. Handwork tends to prevent the formation of this habit simply because it is individual work and adapts itself to individual peculiarities. If taught in such a way that each child is supposed to do the same thing at the same time, it has little to recommend it over other subjects. It is in the case of the youngest children that it is most essential that work should be of an individual nature. Hence we owe a great debt of gratitude to Dr Montessori, who has shown that it is possible to conduct the education of a large group of little children, even in purely intellectual subjects, on individual lines.

The studies of Freud, Jung, and their followers have of recent years brought the subject of day-dreaming, or phantasy as they call it, very much to the front. For Freud, phantasy is a mode of thinking which "gratifies either the egoistic cravings of ambition or thirst for power, or the erotic desires of the subject." Phantasy-making is a mental condition in which every longing is satisfied; it compensates for lack of this satisfaction in reality. By its help man "has contrived to be alternately a pleasure-seeking animal and a reasonable being; for the meagre satisfaction he can extract from reality leaves him starving."[1] Jung takes the view that phantasy formation does not merely serve the purpose of refuge from hard reality, but often points the way by which an inner conflict between desire and actuality, or desire and duty, may be solved.

§ 7. *The Work of Imagination in building up the World of Reality.*—When the imagination constructs worlds of its own, these have their own laws, which in many points resemble the laws of the world of reality, but also in many points differ from them; *the* great contrast, however, between these imaginative worlds and the real or perceptual world is that the former belong to the individual, the latter to humanity. But of this real world we enjoy only fragmentary views; and the completion and unification of these views—on which rests our idea of the world as a whole—is eminently a work of the imagination. What we perceive at any moment is a mere fragment of our surroundings. I see at present about half a room or less; I see a table with various things on it, about half of two walls, a tiny piece of floor; yet the rest of the room, the ceiling above me, the wall behind me, &c.,

[1] See Freud, *Introductory Lectures on Psycho-Analysis* (Eng. tr.), pp. 80 and 311; Constance Long, *Collected Papers on the Psychology of Phantasy*; and Varendonck, *Psychology of Day-dreams.*

is subtly present to my mind though I am not thinking of it. Were there a blank behind me, even though none of my present sensations were changed, yet my total state of mind would be quite different. An experiment that brings vividly home to us the fact that we continually live in a twofold world—viz., that of actual perception and that of memory or imagination—is described by Professor G. M. Stratton in the *Psychological Review*, vol. iv. p. 341. It is a well-known fact that an image cast by any object on the retina is inverted. Professor Stratton had made for himself a pair of glasses which turned this image "right side up," and were so arranged that no light reached his eyes except through them. The consequence of this was that everything appeared to him upside down, and that if he walked, as he thought, towards an object, he found himself going away from it. His motor and touch world was at variance with his visual world, and one curious result was the feeling of misery that this occasioned. But the point that we wish to lay stress on at present is that his memory world was dislocated from his perceived surroundings. He thought of the part of the room behind him as he used to perceive it; consequently every alteration in the retinal field came on him with a shock of surprise. Normally every movement of the head of course alters to some extent one's field of view: this is an alteration in the line which divides the perceived environment from the memory environment. In ordinary experience this takes place without any jar, for what is now brought before the eyes has been unconsciously present to the mind all the time. But when, as in Professor Stratton's experiment, the unconscious continuation of the en-

vironment does not *fit* the part present to consciousness, then the adjustment takes place with effort and uneasiness.

Now the larger environment which is unconsciously present to all of us is not, like the lesser one, mainly a matter of memory, but is literally a creation of the imagination. No one has *seen* the world afloat in space, yet our visual image of the world as a whole is actually a globe afloat in space. The one demand we make of this imagined circumstructure of ours is that it shall fit our perceived environment at whatever point we choose to apply the latter. The microscope, which introduced new possibilities to perception, has marvellously modified our imagined surroundings, adding new possibilities on every side. On the other hand, fairies, brownies, anthropophagi, and men whose heads do grow beneath their shoulders, once denizens in the world of every cultured man, have been banished from our environment, because at no point do we believe it possible for them to enter on our world of perception. Just as the worlds of the different senses must in man correspond point for point, supplementing and never contradicting one another, so must his imagined world dovetail into his sense world. If incongruity occurs, our spirits cannot rest till we have introduced harmony. This is true not only of the material world, but of the world of human beings. A man who has come to sudden poverty and been deserted by his former friends, finds a sudden dislocation between the world he is now immediately conscious of and the world which formed in him a psychological disposition. The latter had been for him peopled by kind and congenial friends, spirits like the friends he knew; now that he recognises these as false hypocrites,

his world of imagination teems with their fellows: he grows a misanthrope and hates mankind.

To the more automatic, less unified processes of imaginative thought the name fancy is often applied. Coleridge quotes as an example of fancy the following verse from *Hudibras*:—

> "The sun had long since in the lap
> Of Thetis taken out his nap,
> And like a lobster boyl'd, the morn
> From black to red began to turn."

As an example of constructive imagination he refers to Milton's description of the approach of the Messiah to battle. The words, "far off their coming shone," gather the whole into the unity of a single picture. It is manifest that constructive imagination requires more sustained and strenuous activity than the mere play of fancy; for it can only utilise those suggested ideas which subserve the development of the general plan and enhance the total effect. Fancy, on the contrary, is free to pass from one combination to another with only a comparatively slight thread of connection (*e.g.*, harmony) with the predominant mood, as gay, comic, pathetic, pensive, &c.

This difference, however, seems to be one of degree. A more important difference is between the imaginative process as guided by education, knowledge of fact and reference to natural law, and the imaginative process unfettered by such shackles. The former is the scientific imagination to the constructive power of which most of our knowledge of the nature of this world, and most of our great inventions are due. The latter corresponds fairly closely to the "phantasy" of Freud and Jung. Some may suggest that it is the imagination of the artist as contrasted with that of the scientist. The imagination of the artist, however, when it is on the highest plane, wins recognition because it also conforms so closely to the laws of reality: hence Shakespeare is regarded as the great painter of human character.

All kinds of mental construction (and Imagination among

them) have been much neglected by psychologists hitherto. Some recent work has been referred to in the foregoing chapter. To this we must add Spearman's stimulating chapter on "Imagination," *Nature of Intelligence*, ch. xx. Among older work which is still valuable, we may mention Sully, *Human Mind*, vol. i., ch. xi.; James, *Principles*, vol. ii., ch. xviii.; Ribot, *The Creative Imagination* (Eng. tr.); Parish, *Hallucinations and Illusions* (Eng. tr.).

CHAPTER XIV.

BELIEF AND REASONING.

§ 1. *Belief: fundamental aspects.*—We are accustomed to speak of Belief as a state of mind with distinctive qualities of its own, which can be traced in all the innumerable forms in which it may actually occur, and which distinguish it in particular from the contrasted mental state of Doubt. As a matter of fact such characteristics can be traced.

(i) We say, "I believe, . . . ;" and if our utterance stops there, the natural question is "*What* do you believe?" Any rational answer to the question brings to light a fundamental aspect of Belief—namely, its claim to be true of reality.

The ways in which the mind comes into contact with reality, other than its own conscious desire or endeavour, have been indicated in the course of the foregoing exposition. We are concerned with this reference to reality as a psychological fact, whatever philosophical interpretation is put upon it. We have experience of a world of real objects; we apprehend them in *perception*, and some of their qualities are revealed to us in the *sensations* of our outer senses. In like manner, in *self-observation* or introspection we become aware of the conscious aspects of our own mental processes; and the chief difficulty of introspec-

tion is to secure that the facts shall be apprehended as they are in themselves—in other words, independently of the effects of our own endeavour to observe them. In *memory*, again, we have actual knowledge of many events in the order in which they entered into our outer or inner experience. In all cases, our knowledge is limited and is liable to error; but this does not invalidate the fundamental fact of direct contact with reality. The psychological meaning of reality in this connection is not difficult to grasp. Our activities are controlled by *conditions*, which are *fixed for us and not by us*. The familiar fact that we are obliged to use certain means to gain our ends, is only an illustration of this. In the absence of miracle, say the ecclesiastics in King Henry V. (Act i., scene i.), "We must admit the means how things are perfected;" and they proceed to discuss the previously unsuspected conditions which must have been real though latent in the character and personality of Prince Henry in order to produce a change, the reality of which is vouched for by memory and perception. Professor G. F. Stout goes so far as to say that "if wishing were identical with having, our freedom would be absolute, and there would be no such thing as Belief."[1]

Some psychologists prefer to use the metaphor of "resistance" in stating this fact of our control by conditions fixed for us and not by us. Thus Professor McDougall observes: "What we really mean, when we assert the reality of a thing, is that the thing has a nature of its own which reveals itself in the resistance which it offers when we strive to change it, compelling us to think out a plan and to exert ourselves for the

[1] *Analytic Psychology*, vol. ii., ch. ix.

realisation of our desire."[1] In many cases the word "resistance" is appropriate (see § 2, below): but another metaphor may be suggested as being of wider applicability. When we say "I believe . . ." an essential part of our meaning is that something has been *given* to us independently of our own conscious desire or volition; and this "given" quality of the object is the psychological ground of our belief in it.

(ii) Belief, as an actual state of mind, is, however, much more than an assertion of something as true. A belief, once established, no matter in what way, has a certain mental stability, and offers a certain resistance to every attempt to change or destroy it. Let the reader call to mind anything which as a matter of fact he *believes;* let him imagine the belief destroyed by a word of criticism or a breath of opposition: the conclusion would be that he had not really believed it at all, and had only deceived himself in thinking that he did so. An author worked up into dramatic form the story of an experienced professional man whose strong belief in his wife's honour was destroyed by a word accidentally overheard from some idle club gossip. The assumption is psychologically false; and the event, if founded on fact, simply meant that he had never really trusted her. So far as we believe anything, so far our belief resists disintegration.

In complete Belief the mind cannot entertain the idea of the contrary, even as a bare possibility. To believe the contrary would feel like saying that "black is white." Herbert Spencer once proposed, as a test of truth, the "inconceivability of the opposite." It is not a test of *truth*, but it is a test of a *psychologically*

[1] *Outline of Psychology*, ch. xiv. (p. 372).

complete belief, which may be a delusion. In fact, the easiest illustrations to give of such beliefs, would be from the various types of delusion.[1] But without entering on this field at all, we should all be willing to confess to the possession of many beliefs so deeply rooted in our minds as to make any contrary assertion seem *incredible*. Through years of personal intercourse with a friend, and experience of his life and habits, I have come to so strong a conviction of his character that when he is charged with certain conduct, I find it *impossible to believe* in his guilt. A belief of this kind is not only an acquired mental disposition but a complex of dispositions, affecting all our judgments, feelings, and actions in relation to the object of belief.

Beliefs take time to acquire any considerable degree of mental stability and strength; they acquire it by the creation of living links with the dominant tendencies of our unconscious mental life.

Professor James had this fact in view when he described Belief as an *emotion*: see his *Principles*, vol. ii., ch. xxi. ("The Perception of Reality"), and quotation from Walter Bagehot's Essay on "The Emotion of Conviction," *ibid.*, p. 308. Mr A. F. Shand, *Foundations of Character*, pp. 461ff., has given an instructive analysis of *confidence* regarded as an emotion, which applies well to the emotional aspect of Belief. Other important references are: Ward, *Psychological Principles*, ch. xiv. ("Belief, Certainty, and Faith"); Stout, *Analytic Psychology*, vol. ii., ch. ix. ("Belief and Free Imagination"); and James, *The Will to Believe.*

§ 2. *How Beliefs are produced.*—For our present purpose, the ways in which beliefs are produced may be classified as follows: (i) Perception and Introspection; (ii) Memory; (iii) Imagination; (iv) Communication; (v) Suggestion; (vi) Reasoning.

[1] See McDougall, *Abnormal Psychology*, ch. xx.

(i) In reference to Perception of the outer world, the statement that the foundation of our beliefs in the reality of things is the resistance they offer to our endeavours, is true in its literal meaning (ch. xi., § 4). The point has been well illustrated by Professor McDougall: "The most complete proof of the reality of any object is the resistance offered by it to our bodily efforts to move or change it. Solidity is overwhelming evidence of reality. There is only one [kind of] evidence still more convincing; and that is the exertion by the object of active pressure against our efforts. Weight or gravitational pressure is the simplest form of this. More convincing still is the active varied resistance to our manipulations offered by other persons and by animals. No one can doubt the reality of the opponent with whom he wrestles in a life and death struggle; or of the enemy who lays a heavy hand upon his neck and forces him to his knees. Opposition, physical or purely moral, offered by other persons to the realisation of our desire, is what gives us the most complete belief in their reality."

It is not of course intended to suggest that the reality which is the object of Belief can be simply defined as "opposition." This is why we widened the meaning of the metaphor, first to the general idea of "conditions fixed for us and not by us," and then to the general idea of something which is or appears to be "given" independently of our own desire and endeavour.

Introspection may be classed with Perception as a mode of observation; the latter being directed to the outer world, the former to the mind's own processes. And what we want through introspection is to observe

the conscious aspects of our mental processes as they are in themselves—in other words, independently of the effects of our own endeavour to observe them (see ch. i., § 2). At the same time we must point out that introspection underlies all the sources of belief named at the beginning of this section. Without introspection there could be no perception, memory, imagination, communication, suggestion, or reasoning.

(ii) In reference to Memory, the reader will see from our previous analysis of Recognition (ch. xi., §§ 2, 3) that Belief based on Perception implies memory in the wider sense of the word. Even when the present sense-impressions are misinterpreted, as in the extreme case of Illusion (ch. xiii., § 4), still the elements added to it from past experience are genuine memory elements, whether or not they take the form of explicit ideas.

We are now, however, speaking of Belief in relation to Memory of the past as distinct from Perception. Suppose that I am asked, as witness in a Court of Justice, Did you see the prisoner on such and such a day? I may remember that I did see him; and my recollection may take the form of visual imagery, or it may take the form of a direct knowledge of the occurrence. If my statement is challenged in cross-examination I may confirm it by recalling events on the date in question, together with the prisoner's movements and my own, and finding that they all hang together in a coherent sequence; and my belief in the truth of my original statement is only strengthened. This illustrates the production of belief in the reality of a past event by memory, and the strengthening of the belief by further acts of memory.

Belief is also produced by a kind of unconscious

memory usually called "intuition." I meet a stranger whom I have never met before, but on converse with him I soon feel distrustful of him. I wonder to myself *why* this is so: which means that I cannot state clearly to my own mind any characteristic to justify distrust. Nevertheless there is a subtle impression given by indications which I cannot define. Such impressions are experienced occasionally by many people, and by some people very often, and they often prove well founded; but the only logic offered in explanation is usually of the form "I know it to be so, because I know it to be so." The real explanation is that I have dealt with other men in the past and (without distinct consciousness of detail) have assimilated the indications which experience showed were those of untrustworthiness. I have thus acquired an unconscious disposition to react to these indications without distinct perception of them.

(iii) When we pass from Memory to Imagination to see what is its relation to Belief, we need not use the word in that wider sense of rational mental construction, as when we speak of "the work of Imagination in building up the world of reality" (ch. xiii., § 7); this process is as much Reasoning as Imagination, as we have pointed out above (*loc. cit.*, p. 459). Our immediate concern is with Imagination understood as the play of imagery, visual or other, and its building up into forms which are not copies or reproductions of past experience (ch. xiii., §§ 1, 2, and 3), and *in this sense* are "unreal." Now in the light of what we have said as to the "reference to Reality" and "claim to Truth" involved in Belief, we should expect to find that, in Imagination, so far as the play of imagery is subject to the control of our own conscious volition

and purpose, so far has it no tendency to pass into or to create Belief; and on the other hand, so far as it escapes such control, so far it tends to create Belief. We find that this assumption is borne out by the facts. For an extreme case take that of the *hallucinated patient*. In an early stage of his trouble, he may dismiss by an effort the phantom figure or the voice whispering of threats or persecution; and so long as he can do this, he does not believe them real, in spite of their sensory vividness. But in a more advanced state of the disorder, he cannot dismiss them; the phantom or the voice is insistent and resists his best efforts to dismiss it. It is at this stage that he begins to believe in its reality. Or consider the case of the *primitive man*, beholding in his dreams the forms of tribal comrades, some living, others dead, as well as those of animals and other things. The forms appear and disappear whether he will or no; hence he *believes* them to be real and animated like himself, and accounts for them by the further belief that all things have a double existence ("Animism"; cp. ch. ix., § 9). And when the *civilised man* misinterprets the evidence of his senses, and his interpretation is a spontaneous mental act inseparable from the sense-impression, he accepts it as *given* and believes it accordingly. In like manner, when an acquired mental bias has assumed the form of an unconscious mental disposition, it may mould the evidence of his senses, or any other evidence, without his conscious intention; so that he believes what he wants to believe, or hopes for or desires, or on the other hand what he dreads. The object hoped for or desired or dreaded appears to be *given* as real.

It would be a mistake, however, to assume that

beliefs produced by Imagination are always delusions, superstitions, or errors. What we said above about "intuition" might be repeated here. An "acquired mental bias" may be well-founded.

(iv) In mentioning "Communication" among the ways in which beliefs are produced, we refer to statements made by others, and made in order to be believed, which we do believe without personal verification because we are willing to accept their trustworthiness. On this assumption we accept their statements.

It is evident that to Communication, so understood, each of us owes by far the greater part of the beliefs which constitute the working capital of his mind. It covers the process of our education in the widest sense, including everything that we accept through reading and hearing, and every occasion in the course of our lives where statements made by others—and made, we repeat, in order to be believed—are accepted by us and believed accordingly. It is practically impossible for us to verify personally more than a comparatively small part of what we accept in this way. The conclusions of history and physical science abound in illustrations of this. Take the theory of electro-magnetic radiation as a property of the ultimate particles of matter—a theory the development of which is the outcome of strenuous labour and minute research carried through by a succession of men of genius such as Faraday, Clerk Maxwell, Lodge, Thompson, Rutherford. We may be unable to understand any of the methods by which such a theory has been established; but we accept it because we trust the methods of Science, and the spirit and purpose of her army of workers. Or take an illustration of a different kind. Occasionally we meet with a person who denies the roundness of the earth. So far

as he can observe it, it appears to be flat; and therefore he believes it to be flat. Most of us at once reject his pretentions, without any attempt to verify the roundness of the earth, but because of our confidence in a vast work of constructive interpretation which has been built up by the co-operative thinking of many generations, on which is based all that we have been taught about the earth and its relation to other bodies in the heavens.

In many of the most familiar pursuits of everyday life, where personal verification would be possible, there is neither time nor reason to insist on anything of the kind. "The clerk," says Carlyle, "cannot be always testing his 'ready-reckoner.'" True, he finds by using the ready-reckoner that he does not go wrong—it "works" or is verified by the results of using it. The same may be said of some conclusions of applied Science; they admit of verification apart from our understanding of the methods by which they are reached, because we can observe their working. The astronomical information given in the predictions of the almanac—the hours of rising and setting of the sun and moon, and of high and low tide, the eclipses of the sun and moon, and so forth—are an effective illustration of this practical verifiability.

Verification of this kind introduces us to Reasoning as a way of producing beliefs; and this subject will be discussed below (§§ 5, 6).

(v) When we name Suggestion among the ways in which Belief is produced, we use the word in a restricted sense which has been found convenient, and even necessary, in recent psychology. By Suggestion we mean a special kind of communication—namely, the process in virtue of which beliefs are directly induced in the mind by a kind of psychological influence or force,

independently of logical evidence or reasoning to the conclusion. The absence of reasoning or rational persuasion does not necessarily imply that the belief is wrong; it is only a "negative characteristic" of the method by which the belief is produced.

It is true that in extreme cases suggestion passes into the region of the abnormal, as when the suggestions of the hypnotiser produce actual hallucinations in the hypnotised person. There is, however, a broad region of normal, familiar fact where we can observe the production of beliefs by Suggestion without reasoning. Much of the art of advertising, and many modern methods of propaganda in politics and other important subjects, are of this kind. The tendency to receive suggestions—in other words to assimilate beliefs without reasoning them out — is called Suggestibility. Every one is suggestible to some extent—some much more so than others. Suggestibility, for example, makes a man susceptible to social influences in the formation of his beliefs (and the determination of his conduct).

The relation of Suggestion and Suggestibility to Belief will be discussed in the following section.

(vi) The essential character of Reasoning is that by it we may attain to beliefs which are new and true, independently of new perceptions, and of recollection, imagination, communication, or suggestion. The process of reasoning is essentially the combination or synthesis of beliefs already held; and these *when combined* are found to warrant a new belief which could not have been derived from any of them separately. The data combined are called the "premises" of the inference, and the new belief warranted by *the combination* is called the "conclusion." But in order that the data

combined may yield any conclusion, they must have something in common. This is called the "middle term"; it is, so to speak, the pivot on which the inference turns. The process will be analysed below; in this place a simple illustration will serve to give concrete significance to the statements just made. A traveller walking alone on a moor has lost all his bearings, and does not know which way to turn, when suddenly on the far horizon he catches sight of a hill of a peculiar shape, which he recognises; and he knows the way from that hill over the distant rising ground to his destination out of sight beyond. Here we have two data: the way from here to the hill (perceived), and the way from the hill home (remembered). These premises have a middle term, the hill, and this common factor warrants the conclusion, "now I know my way home." If he had mistaken the shape of the hill, there would have been no real middle term and no valid inference. He would still have been lost. And even with the recognition of the hill, giving one premise, there could have been no inference until the second premise, the recollection of the way home from the hill, had been added.

What we have said on the reference to reality psychologically implicit in Belief, is equally evident when the content of the belief is expressed in a proposition.

"The streets are wet"; "Mary has blue eyes"; "The earth goes round the sun"; "Two and two make four." Obviously, in any of these propositions, there is a reference beyond the conceptions in the speaker's mind. They express beliefs about things and relations among things *in rerum natura:* when any one understands them and gives his assent to them, he never stops to think of the speaker's state of mind, but of what the words represent. When states of mind are spoken of, as when we say that

our ideas are confused, or that a man's conception of duty influences his conduct, those states of mind are viewed as objective facts in the world of realities. Even when we speak of things which have, in a sense, no reality, as when we say that a centaur is a combination of man and horse, or that centaurs were fabled to live in the vales of Thessaly, we pass at once to the objective reference of the words, to the world of Greek mythology.

§ 3. *Suggestion and Suggestibility.*—It has been already pointed out that it is in hypnotism that the most striking examples of the power of suggestion are to be found. The hypnotised person accepts the assurance of the hypnotist even against the evidence of his own senses; he can be made to receive salt as sugar, water as wine; if a needle is pushed into his arm he feels no pain, if he is assured that the process is painless; he is blind and deaf to stimuli which are not sanctioned by the operator; he sees and hears as and when he is permitted. It seems certain also that in this condition organic processes which as a rule are outside the sphere of volition become accessible to influences from the higher nerve centres; in other words, the belief induced by suggestion is often on the one hand a curative, or on the other a toxic belief. The suggestible person seems to have the power of reverting to a plane of life on which departmentalism is less rigid than in the fully developed civilised educated man.

In normal psychology we find in the behaviour and attitude of the young child instances of suggestibility which resemble closely those supplied by the hypnotist.

The pain which mother kisses away does as a matter of fact disappear; her assurance makes palatable the nauseous medicine; her embracing arms assure the

child of safety. Throughout life the conditions under which suggestion is most prone to take place are those which reproduce the child-parent relation. For many years a child's critical faculties are never aroused in connection with the expressed opinions of his parents. These opinions he accepts without question—in many cases even when his own observation might demonstrate their falsity. To any adult who by authoritative statement or otherwise puts him into this receptive attitude he will prove suggestible; to any who awakens in him the self-assertive, aggressive side of his nature he will prove contra-suggestible. In neither of these cases are his beliefs determined by reason. As childhood is left behind, suggestibility decreases; but rarely does it disappear altogether, for in most people the child is not so much outgrown as repressed and covered over, and in certain circumstances may reappear practically unchanged.

Emotional states in which negative self-feeling is an element are those which tend to produce suggestibility. From those whom we regard with respect and admiration we require no proof; we accept their beliefs without question. Such beliefs may be expressed in words or in attitude and behaviour. From our earliest years the social pressure of the particular set of people among whom we live is gradually and inevitably moulding our thoughts in such a way that prejudices and preconceptions are formed of which we are unaware, but which undoubtedly colour all our subsequent thinking and acting.

The power to suspend judgment develops late in man's history. Belief is the primitive response. One of the most effective modes of administering suggestion is simple assertion, repeated again and again. This is

the method employed by Coué: his famous phrase, *Every day and in every way I am getting better and better*, when said over and over again does in many people actually produce the improvement asserted. Many advertisements bring about belief in the merits of what they advertise in a similar way: they give no evidence, they simply assert. The monotony of the repetition possibly lulls our reason to sleep, inducing in some people a light hypnosis in which the suggestion becomes effective.

Baudouin, who has developed a theory of suggestion based on Coué's practical work, maintains that all suggestion is auto-suggestion—*i.e.*, that the condition of the recipient is the really important factor in the situation. This probably is true; yet it is certain that the necessary condition cannot always be self-induced, and almost always involves the relation of the self to some person or power other than self. It is readily produced by circumstances which force upon us a realisation of our weakness and ignorance. Teachers, preachers, physicians, statesmen, in virtue of their position impose beliefs on others through suggestion. The press, or public opinion in some other form, has the same power. The presence of a crowd or group of people produces in many negative self-feeling, and so renders them suggestible to beliefs which are or appear to be those of the group. Conditions of sickness, panic, or religious excitement similarly promote suggestibility.

The student will see that it is impossible to make any sharp differentiation between belief springing from simple communication and belief springing from suggestion. Most concrete acts of belief probably derive from both factors. Suggestibility decreases or

vanishes according as we preserve our sense of equality with or superiority to the source of belief—according as we accept it without emotion and regard it as modifiable in the light of subsequent experience and information; it increases according as we feel the source of information above us and outside the range of our criticism—according as we adopt towards it the child-father attitude. Beliefs due to suggestion are accepted as part of ourselves, and outside criticism of them is often hotly resented.

§ 4. *Part played by Language.*—In an earlier chapter of this book we referred to the effect of language in moulding the development of space-perception. This is only one example of the immeasurable influence of a developed language on the growing mind of the child, as he enters into it and assimilates it as part of his social inheritance.

It provides him with an outline map of ways of thinking about the world. We refer to something more fundamental even than what we have called Communication. Communication covers the acquirement of innumerable beliefs of all kinds through hearing and reading, and so assimilating the results of the experience and activity of others, and of past generations. But there are certain ways of thinking about the world so fundamental that they underlie all other thinking—fundamental assumptions about its structure, which philosophers have called "categories." Every developed language is like an outline map of these "categories." Take two groups so different, in many respects, as the Indo-European family of languages and the Semitic family. Both of these have "nouns" and "adjectives," including adjectives of quality, quantity, and position ("this," "that," &c.); and to these grammatical dis-

tinctions correspond, on the mental side, the analysis of the world of experience into particular persons and things, the distinction of objects and their qualities, and distinctions of number and position. Both, again, have "prepositions," distinguishing relations between things, especially relations of space, time, and causation. Both have "verbs" and "adverbs," distinguishing activities of persons and things, and qualities of their activities; together with verbal "moods," especially assertion and command. To the grammatical structure of language corresponds what we must call a *structure of our thinking*, and consequently of our Belief. The words and sentences that fall upon the ear of a child, and are soon upon his lips, express not so much his own personal thinking as the common thinking of his kind, which becomes, as it were, a rule or measure to which his own must conform. "Why, for example, does a child have no difficulty about the relation of substance and qualities, that has given philosophers so much trouble? And why do all children understand it or seem to understand it alike, whatever their experience may have been? Why, but because the language put into their mouths, and which they must e'en use, settles the point for them, one and all; involving as it does a metaphysical theory which, whether in itself unexceptionable or not, has been found serviceable through all the generations of men." We use our own private experiences "mainly to decipher and verify the ready-made scheme of knowledge which is given to us *en bloc* with the words of our mother tongue."[1]

The origin of language, in the history of the race, is a problem beyond the range of this book. But, if we

[1] Croom Robertson, *Philosophical Remains*, pp. 68, 69.

assume a developed spoken language existing in the society into which the child is born, we can trace some of the principal steps by which language comes to play so great a part in the formation of his ideas.

Students of child-psychology have observed that the normal child's second year—though with much individual variation—is the period when he discovers the value of names in connection with his experience of the outer world. The discovery has two aspects: (i) that things, which he has already made out or distinguished, have names, and (ii) that the use of names, whether by communication, imitation, or invention, *helps to the discovery of things.* The relation of the thought to the name is like the dependence of the process of tunnelling underground on the building of an arch in the portion already excavated; and when the tunnel is carried a stage further, this must be arched before another stage can be carried out.

Naming helps thinking in two ways. It helps us (i) to identify things, (ii) to classify them.

(i) To give a name to an object is to give it a certain independence and permanent existence of its own, which it must have in order that we may even *recognise* it. Some of Professor Köhler's chimpanzees showed much sagacity in the use of boxes to help them climb to get at the food placed above them; but he found that a box put back in a corner was to them, in face of the same practical problem, simply an undistinguished feature of the background. They could use it when before them, but they could not recognise it and fetch it. The invention or acquirement of a name, even if only for that particular box, would have made all the difference. The box would then have been more than merely a thing happening to be present here and now,

and useful to get at this food; it would have been an independently existing thing with characteristic qualities and utilities. And the generalising force of the name would have led to a further extension of the thought: namely, of the box as a *kind* of thing, belonging to a class marked by those characteristics. In the case of a child, the natural capacity of his thinking, guided by a growing acquisition of his mother-tongue, would have led him to identify the object in the way we have indicated. Mr Ernest Thompson-Seton's *Biography of a Grizzly* contains an incident which, though psychologically impossible for a lower animal, affords an effective illustration for our purpose. In his "cubhood" the grizzly, exploring the edge of a stream, had his paw caught in a beaver-trap, which he dragged away with him. "His little green-brown eyes glared with a mixture of pain, fright, and fury as he tried to understand his new enemy. He lay down under the bushes, and, intent on deliberately crushing the thing, he held it down with one paw while he tightened his teeth on the other end; . . . the trap jaws opened and the foot was free. It was mere chance, of course, that led him to squeeze both springs at once. He did not understand it, but he did not forget it; and he got these not very clear ideas: 'There is a dreadful little enemy that hides by the water and waits for one. It has an odd smell. It bites one's paws, and is too hard for one to bite. But it can be got off by hard squeezing.'" This is just how a bear would not think of such an experience, and could not, unless indeed he had inherited or invented a language and carried it to a stage of development beyond that of some types of primitive men. For the bear to profit by this experience, mere recognition on another occasion, without memory, would

be enough (see above, ch. iv. § 4; ch. xi. § 2). But the illustration shows effectively how an entirely new experience, at the human level, while not really understood, could, *with the help of language*, be analysed into details, familiar in themselves, which are generalised and combined with a view to future guidance. This brings us the second of the two fundamental ways in which language helps thinking.

(ii) As the child learns to use his mother-tongue he meets with a very important difference of usage among names, corresponding to the grammatical distinction of "common nouns" or *class-names* and "proper nouns." Some names are applicable to a number of different individuals; others are applicable only to a single individual, person, place, or other thing. Little children sometimes try to use every name as if it were a "proper noun"; but the effect of the class-name is inevitably to correct this and set going the process of generalisation. To *generalise* is to think of a number of *different* individuals as resembling one another in some distinguishable characteristics to which we direct our attention. When we analysed the process of perception we indicated the importance of *recognition* as implying previous perception. Recognition is at least *implicit* generalisation; the "feeling of familiarity" means "I have had this before"; and to recognise with explicit ideas, in other words, with memory, is to assimilate or *classify*.

The process of becoming aware of a common element connecting two or more different particulars is called *conception*. Conception is the act of thought which grasps the common element. The thought of the common element (distinguished from the various particular cases in which it appears, and identified as

the same in all of them) is called a *concept*. The concept as such must of course be distinguished from any kind of mental image, and as a matter of fact is constantly used in our thinking without the accompaniment of any mental image whatever.

If we fully realise the mental level on which alone conceptional thinking is possible, it will not surprise us to find that in the child's learning of language we can distinguish a stage which is preliminary to conceptional thinking and out of which conceptional thinking springs. In the young child's association with the adult, words are constantly being used in connection with certain situations. The total situation is realised more or less clearly by the child. It is not at all likely that the elements which are most prominent to him are always those which are most prominent to the adult or those which are indicated by the words used; at all events it happens that he often later reproduces the word on the stimulus of elements to which in our view it has no reference at all. Any one who frequents the society of children in their second year will be able to gather a store of examples. We give one which came under our own notice. Baby was just finding the use of her tongue when one day she amused those who were with her by loudly hailing a red pillar box as *dada*. The mental process becomes plain to us when we think of incidents of great importance in the little one's life. Every morning would come the proposal, "Take the letters to *dada*," and very often in her presence letters would be put in the pillar, very likely by *dada*. In this case there is a certain gap bridged by the letters. A simpler case is supplied by the little boy who, hearing the words *quack quack* used when he was watching ducks swimming

in a pond, afterwards brought out the sound when he saw water, and later when he saw any liquid.

This last extension of the term to *similar* things shows how the stage we have just distinguished passes by imperceptible gradations into the real naming stage well described by Sully in the following passage. "At first we find that the use of general names is confined to classes of objects having numerous points of similarity, and so easily representable in the pictorial form of the *generic image*, as 'dog,' 'house,' and the like. Here the name is not used with a clear consciousness of its general character or function. Yet the very application of one and the same name to successive percepts is an important aid to those processes of reflective comparison and selection of common features by which the apprehension of generality arises. To begin with, any use of a name to mark the result of an assimilative process serves to call attention to and to emphasise the existence of like features. Not only so, the name being applied to each of a series of percepts is a valuable means of recalling these together, and so furthering that extended process, the comparing of a number of things, which underlies generalisation. More than this, since the name from the beginning serves to emphasise and register the fact of likeness, it greatly facilitates the subsequent careful analysis and definition of the common features. Of special service here is the hearing of names applied by others to a variety of things, as when a multitude of unlike things are called 'plants,' and so on. Such announcement of likeness as yet undiscovered by the child serves, as we know, as a powerful stimulus to a comparative examination of the things, and thus urges the child on along the conceptual path. The greatest

use of general names, however, in connection with general ideation or conception, is in definitely marking off and rendering permanent each new result of analysis and comparison. Thus, on reflecting on dogs, with a view to see in what exactly they do agree, in spite of their differences, and on gradually gaining clear consciousness of this, that, and the other characteristic feature of form and action, a child demarcates, and definitely registers these results of abstraction by the help of a name."[1]

§ 5. *Reasoning.* — In psychology we are not concerned (as we are in Logic) with the question of what is the best or soundest kind of reasoning; we are concerned with only the analysis of the kinds of reasoning which, as a matter of fact, are employed in our thinking. Reasoning or inference has already been defined and illustrated. The essence of the process—we repeat—is the putting together, the combination or *synthesis*, of two or more beliefs (the "premises") which, when their content is explicitly stated, involve a common factor (the "middle term"); and by means of their common factor the combination reveals a new fact which could not be derived from any of the premises taken separately.

In considering any examples of inference, even in its simpler forms, we must remember not only that an inference may be extremely condensed in its verbal expression, as in the saying, "This is too good to be true"; but that a whole process of reasoning may go on in the mind very rapidly and effectively, and yet may be all *implicit*, in other words, may proceed independently of any kind of mental imagery, even that of language. When Robinson Crusoe saw the footprint

[1] Sully, *The Human Mind*, vol. i., ch. xi., § 23.

on the sand, he started back in a state of complex and confused emotion; but this was not a response to the mere visual impression; it was his reaction on the conclusion of a process of reasoning by no means simple in character, which passed almost instantaneously through his mind. The first step may be expressed thus: "All prints of such a kind are made by men; this is a print of such a kind; therefore this was made by a man." Here we have a fully explicit statement of what was psychologically implicit. In like manner the second step may be expressed: "I have not been here before, therefore this was not made by me but by some other man." And so forth, until the disquieting conclusion is reached that the unknown man is somewhere at hand.

When we remember to take account of what is psychologically implicit in any process of reasoning or inference leading to a new belief, we shall find—with the help of some typical examples of inference in its simpler forms—that three types may be distinguished. These may be conveniently described by distinguishing between what we may call *individualised* beliefs and *generalised* beliefs (cp. also § 4, p. 480). An "individualised" belief relates to a particular fact or case or a number of such cases; a "generalised" belief, on the contrary, seeks expression in a statement beginning with "all" or some synonymous adjective or adverb: *e.g.*, "all animals are mortal."[1] Inference or reasoning may be (i) from one or more individualised beliefs to a generalised belief; (ii) from one or more individualised beliefs to another individualised belief; (iii) from a generalised belief to an individualised belief.

[1] We have intentionally given as illustration a statement which, though usually *believed*, is not true as a matter of fact.

Most of our reasonings are of a composite character, in which more than one type can be traced. The examples which we shall give should be regarded as typical specimens for analysis, like botanical specimens for dissection. As psychological illustrations of reasoning, they are chosen as being elementary in form and not too abstruse in subject-matter. For our purpose it is necessary to give them, not in any contracted form, but in a form which makes their content and meaning explicit.

(i) Consider the following:—

Ex. 1.

Yesterday it rained in the evening;
All yesterday the smoke tended to sink;
Therefore smoke-sinking may be, or is sometimes, a sign of rain.

This is evidently of the type (i) above. We have two individualised beliefs, and a "middle term" connecting them; and the conclusion is a suggested generalisation. As it stands, however, it is little more than an observation and a guess. The ground for a generalisation is stronger in such a case as the following:—

Ex. 2.

Three species of butterfly, genus x, closely resemble three species of y;
The species of x would be protected by resembling y, because y is distasteful to birds;
Therefore the resemblance may be a "protective resemblance," — *i.e.*, a resemblance brought about by the survival of those thus protected.

In all such arguments we attempt to generalise from one or more particular cases. To generalise in this way seems to be a fundamental tendency of our rational nature. The process is necessary, and justifiable, provided we bear in mind the caution that generalisations based on "simple enumeration of particular cases"—as the logicians call it—require further investigation and testing before they can be accepted as valid conclusions. The instances which we have in view serve to raise the question, is there a *real connection* between the two qualities or characteristics which we have noticed in each of them, or is the combination merely accidental?

Let us now return to the illustration of the sinking smoke (*Ex. 1*), and carry the argument a step further:—

Ex. 3.

Smoke that goes downwards is heavier than air;
Particles of moisture are heavier than air;
Therefore particles of moisture may be in the descending smoke.

This argument again is of the type (i). As it stands, it is inconclusive; because the smoke may be sinking for some reason having nothing to do with particles of moisture. But it affords a *tentative* justification of the generalisation originally suggested; it assigns a *possible cause* by bringing forward an analogous case,—a cause which would naturally act in the way suggested. In the case of the protective resemblance (*Ex. 2*), this kind of argument produces a rather stronger justification:—

Ex. 4.

Protective resemblances naturally increase through series of species from slighter to closer resemblance;

The resemblances in question increase in genus x from slighter to closer resemblance to y;
Therefore the resemblances in question show important signs of being protective.

Arguments of this kind are of great importance in practical life. It is true that they may be so inconclusive as to be simply silly if put forward seriously; for instance:—

Ex. 5.

Fever-stricken persons are excessively thirsty;
This person is excessively thirsty;
Therefore he is fever-stricken.

Here we have an attempt to argue from a "sign" or "symptom" which may have quite other causes. And yet when we have a number of independent symptoms all suggesting the same conclusion, we regard the conclusion as practically certain. A medical "diagnosis" is really an argument of this kind. And, in like manner, in legal investigations, a "coil" of *circumstantial evidence* consists of nothing else than a series of such reasonings. For example: a person is found in an uninhabited house, dead from the effects of a wound; and on that same evening, a man, A. B., is seen running away from the neighbourhood of the house.

Ex. 6.

Murderers flee from the scene of the crime;
A. B. flees from the scene of the crime;
Therefore A. B. may be the murderer.

This, by itself, is of course very inconclusive. But if, when A. B.'s house is searched, it is found that his clothes are blood-stained, then we may make another argument of the same kind, with conclusion pointing

in the same direction. Similarly with other items of evidence—*e.g.*, A. B.'s boots fit the fresh foot-marks going from the house where the murder was committed; and so on. Many times a group of such arguments has led, rightly or wrongly, to the execution of a prisoner.

Arguments from *analogy* are all, fundamentally, of this type. Analogy is any resemblance between two things which enables us to believe of one what we know, or think we know, of the other. As an argument, it has all degrees of value,—from being worse than worthless (when the resemblance lies in merely accidental qualities) to being a ground for a practically reliable conclusion. We get the best results when we do not merely *count* the points of resemblance, but *weigh* them. We may have a *convergence* of analogical arguments leading to practical certainty; for instance:—

Ex. 7.

In districts exposed to glacial action at the present time, we find (*a*) scored or "striated" rocks, (*b*) perched boulders, (*c*) lateral and terminal "moraines";

In this English valley we find striated rocks, perched boulders, and moraines;

Therefore this English valley was once exposed to glacial action.

Such a convergence of analogies, each inconclusive by itself, leaves no room for doubt. Of one such case Charles Darwin said, "A house burnt down by fire did not tell its story more plainly than did this valley."

Strictly speaking, an argument from analogy—as it has been said—"sticks in the particular instances," and does not work out a generalisation. But the

generalisation is not merely implicit; it is directly suggested by the mental process of framing the analogy. From the cases compared, we pass to a general principle or law illustrated in them. It is, therefore, as a piece of reasoning, essentially of the type (i).

Reasoning of this first type corresponds to what logicians call "inductive generalisation." Professor McDougall, *Outline of Psychology*, p. 408, observes: "This tendency to inductive generalisation is fundamental, and is exhibited at all levels of mental life. At the lower level, it is merely the tendency to react to similar things, things presenting similar sensory cues, as though these were the same thing over again; and, because the world is so full of a number of things which do fall into natural classes, the members of each of which present similar sensory cues, and are essentially similar for our purposes, this tendency in the main serves us well; and, in spite of the errors to which it gives rise, it is the source of our highest scientific generalisations or laws." For an introduction to the theory of inference from the logical point of view, see Mellone, *An Introductory Text-book of Logic*, and Welton, *The Logical Basis of Education.*

The use of language greatly strengthens our natural tendency to generalise. Thus, to use any common noun or name is to assert that the thing named has essentially the same nature as other things so named, and that we may expect of it what we expect of those other things. This works well when we are dealing with any of the innumerable *natural classes*, as we may call them,—objects which Nature has grouped in kinds; otherwise great caution is required to guard against hasty generalisations and false conclusions.

(ii) We distinguished a second type of reasoning as from two or more individualised beliefs to another individualised belief. The interest lies in the individual

cases; we pass directly from one to the other without even any implicit generalisation. The most familiar quantitative or measurable aspects of experience produce arguments of this kind. I weigh two objects in succession against a pound weight in the scales and they exactly balance it: their weight is therefore the same,—one pound. In abstract terms, "A and B are equal to the same thing (C), therefore they are equal to one another." A girder stated to bear a strain of twenty tons is tested to thirty tons without injury: therefore it can very safely be used in a bridge bearing only ordinary wheel traffic. In abstract terms, "A (tested resisting power) is greater than B (stated resisting power), B is greater than C (required resisting power), therefore A is greater than C." And so on. Relations of time and space likewise produce many examples: "I was not more than three years old when it happened, for it was some time before we removed to Liverpool, and I can remember my fourth birthday was after that." The example of the lost traveller, given above in § 2 (vi), is another effective illustration of the same type. In the case of relations of time, space, and quantity, the mental process is essentially one of imaginative construction. I may even visualise a diagram, or if I am not a good visualiser, I may fall back on motor imagery as though I were tracing out the relations by movement. The conclusion is at once arrived at by means of the common term.

Closely allied to these inferences based on *serial order* in space, time, quantity, or other relationship, are the inferences of identity derived from two beliefs already formed in the mind. Thackeray tells the story of a French Abbé of the Louis Quatorze period who, in conversation with a number of ladies, observed:

"Ah, ladies, a Priest sometimes has strange experiences: my first penitent was a murderer." A few moments later, the principal nobleman of the neighbourhood entered the room: "Ah, here you are, Abbé: do you know, ladies, I was the Abbé's first penitent, and I declare to you my confession astonished him!"

In his well-known treatise on Logic, John Stuart Mill pointed out that inference may take place without generalisation. We have already affirmed this; but Mill based on it a theory that *all* genuine inference or reasoning is from one individualised belief to another, or "from particulars to particulars" as Mill puts it. "Not only may we reason from particulars to particulars, without passing through generals, but we perpetually do so reason. All our earliest inferences are of this nature. From the first dawn of intelligence we draw inferences, but years elapse before we learn the use of general language. The child who, having burnt his fingers, avoids thrusting them again into the fire, has reasoned or inferred, though he never thought of the general maxim, fire burns. He knows from memory that he has been burned, and on the evidence believes, when he sees a candle, that if he puts his finger into the flame of it, he will be burned again. He believes this in any case which happens to arise, but without looking in each instance beyond the present case. He is not generalising; he is inferring a particular from particulars. . . . It is not only the village matron who, when called to a consultation on the case of a neighbour's child, pronounces on the evil and its remedy on the recollection and authority of what she accounts the similar case of her Lucy. We all, when we have no general maxims to steer by, guide ourselves in the same way."

It is true that in a great deal of our reasoning we do not form general propositions; and it conforms to the instances given by Mill. But we have to ask, What is the psychological link by which we pass from one "particular" to another? It is the *resemblance* of the two cases—certain qualities which the two cases have in common. It is the *re*-cognition, in the second case, of attributes found in the first. These *common* characteristics form the only bridge by which we can pass from the one "particular" to the other. What, then, does this perception of similarity *imply?* The cognition and recognition of qualities common to different objects implies the formation in the mind of a general idea of those qualities,—a "universal" (see above, § 4, page 480). When the child's experience of fire gives him an idea of it which he can extend to a new case, it is a universal idea. The child may not separate the universal from its embodiment in the particular case, or put it into language even to himself; but he reasons through it. And when the reasoning is explicitly put into words, it must take some such form as this: "The qualities of brightness, movement, &c., found in that object, are also found in this; that object burns, therefore this, which has the same general nature or is of the same type, burns also." In such reasonings *we have derived a general principle from one case and we apply it to another.* This introduces us to the third type of reasoning: not from individual to general; nor from individual to individual; but from general to individual.

(iii) Whenever we apply previous knowledge to a given case, we are reasoning from a generalised belief to an individualised belief. We may be puzzled, for example, by the liability of thick glass to crack more

easily than thin glass, when heated. Stated formally and fully, the relevant reasoning would be this: Whenever material substance is heated, it expands, and glass, being a material substance, expands when heated; all hotter substances expand more than those which are less, so that when thick glass is heated, the surface is (at first) hotter than the interior, hence the surface expands more than the interior." Here the propositions beginning "whenever" and "all" are evidently generalisations already formed and accepted, and they are applied to a given case about which a question has arisen. The "middle term" can easily be traced in both cases.

If we turn again to the inquiry supposed to be raised in examples (i) and (iii) above, as to the connection between smoke and rain, we may sum up the result of it in an inference from general to individual in some such form as this:—

Ex. 8.

All particles that sink in the air in damp weather more than in dry are loaded with moisture when they sink;

Smoke that descends before rain is an example of particles that sink in the air in damp weather more than in dry;

Therefore smoke that descends before rain is loaded with moisture when it descends—*i.e.*, is really connected with the cause of rain.

Inference of this kind is of the greatest importance both in science and in practical life. Science seeks for results which are *laws*—*i.e.*, statements true universally about certain kinds of fact; and every time we explain a fact by the law—*i.e.*, find a new complete application

of the law, we have an inference of this third type. Logicians call it "deductive reasoning."

We see, then, after this brief examination of typical examples, that the distinctive feature of reasoning, as a mental process, is the use of a "middle term." When two beliefs thus involve a middle term, and some desire or other interest of the mind leads to their combination, then the combination by means of the middle term produces a new belief.

§ 6. *Imagery and thought.*—When speaking above, in § 4 (ii), of *conception* as the act of thought which grasps the common element in two or more different particulars, and of the *concept* as the thought of this common element distinguished from the various particular cases in which it appears and identified as the same in all of them, we observed that "the concept as such must of course be distinguished from any kind of mental image, and as a matter of fact is constantly used in our thinking without the accompaniment of any mental image whatever." This means (i) that a concept is a mental creation, distinct from a sensation, sensory image, or affective or volitional state—a specific mental element, playing an indispensable and preponderant part in *thinking;* and (ii) that while a concept may attach itself to a sensory image of some kind (usually, but not necessarily, the motor-speech or auditory image of a *word*), it may also function in mental life unaccompanied by sensory images of any kind; in fact, that imageless thinking pervades our rational life.

In recent years this conclusion has been winning its way to more general acceptance than was the case twenty years ago, when it was quoted and defended in the first edition of this book. It can be established only by very careful introspective observation.

The following passage is from Professor Spearman's stimulating book on *The Nature of Intelligence*. He states[1] that in his own mind the process of thinking "not only reveals very few and poor images of the things themselves, but often appears to be equally devoid of verbal presentations. This may perhaps be attributed in some measure to prolonged residence in foreign countries, whereby most concepts have become almost as likely to evoke a foreign as a native word. The result seems to be a mutual interference; frequently the rise of an idea is followed by a pause for the purpose of deciding into which language to render it. Such a general course of cognition as that of the present writer, surging on like a deep dark formless sea, and almost unconcerned with the meagre sentience incoherently twittering in a higher level of cognitive intensity, may be contrasted with the mind that describes itself as follows[2]: 'It is a fairly complete picture-gallery, not of finished paintings but of impressionist notes. Whenever I read or hear that somebody has done something moderately or gravely or proudly or humbly or courteously, I see a visual fragment. . . . The stately heroine gives a flash of a tall figure, the only clear part of which is a hand holding up a steely-grey skirt. . . . I never sit down to read a book or write a paragraph or think out a problem without a musical accompaniment. There are occasions when my voice rings out clearly to the mental ear and my throat feels stiff as with much talking.'"

Professor Titchener's characterisation of his own mental operations in thinking is of much interest: but

[1] *Op. cit.*, p. 121.

[2] E. B. Titchener, *Experimental Study of the Thought-process*, p. 9 (quoted by Spearman, as above).

of course it does not in the least invalidate the conclusions that sensory imagination is not indispensable, and not even useful for thought.

Recent work on this subject should be studied in Spearman, *The Nature of Intelligence*, and Aveling, *The Consciousness of the Universal* (cp. also T. V. Moore, "Imageless Thought," in the *Psychological Review*, vol. xxii. 1915, and vol. xxiv. 1917). Earlier work may be studied in the elaborate papers by K. Bühler on "Tatsachen u. Probleme zu einer Psychológie der Denkvorgänge" in *Archiv. f. d. Gesammte Psychologie*, vol. ix. (1907), No. 4, and vol. xii. (1908), No. 1. The author endeavours, by experiments in the form of question and answer with skilled introspective observers, to establish the reality of *Gedanken*, "thoughts," regarded as specific mental elements, ultimate units of our thinking experiences, different from sensations and images; experiences which are truly and sufficiently defined as a "knowledge about" or a "consciousness of," and which have nothing of the nature of sensation or sensory imagination about them. In further illustration of the position, the reader may be referred to the *Journal of Philosophy, Psychology, and Scientific Methods*, vol. iii. (1906), No. 26, where Mr R. S. Woodworth argues on introspective grounds that thought contains elements which are wholly irreducible to sensory terms; that even where there is imagery, it cannot be essential, because "it is often vague where the thought is focal," or it is irrelevant, or mere associative by-play; that every thought has a particular *meaning*, which is not "a mere relation between an image and the object to which it refers." We may also mention the same writer's paper on "Non-sensory Components of Sense-perception," *ibid.*, vol. iv. (1907), p. 70, and his essay on "The Consciousness of Relation" in the volume, *Essays Psychological and Philosophical in Honour of William James* (1908); and Miss M. W. Calkins' paper, "The Abandonment of Sensationalism in Psychology," in the *American J. of Psychology*, vol. xx. (1909), No. 2. The reader of French may be referred to M. Bovet's instructive Review of Bühler's work and the re-

searches which led up to it: "L'étude expérimentale du jugement et de la pensée," in *Archives de Psychologie*, vol. viii. (1909), No. 1.

The whole series of investigations, including work by K. Marbe, A. Binet, N. Ach, A. Messer, H. J. Watt, R. S. Woodworth, K. Bühler, E. von Aster, E. Dürr, is fairly described by Titchener, *Lectures on the Experimental Psychology of the Thought-processes* (1909). He criticises all the work to which we have referred, from the standpoint of Psychological Sensationalism; but some of his pages leave on the reader's mind the unpleasant impression that he is setting a psychological characterisation of his own mind against the systematic and elaborate work of a number of equally competent observers. His essential criticism rests on the difficulties of introspective analysis of a complex thought-process (pp. 148-151), and follows E. von Aster ("Die psychologische Beobachtung u. exp. Untersuchungen von Denkvorgängen," *Zeitschrift f. Psychologie*, vol. xlix. (1908), No. 1) and E. Dürr ("Ueber die experimentelle Untersuchung der Denkvorgänge," *ibid.*, No. 2). Professor Titchener admits, however, the importance of the *Bewusstseinlage*, the determining trend or tendency of consciousness in the working out of a thought-process, — a conscious tendency which is more than *merely* affective or conative. His own position is that of Sensationalism as "a heuristic principle, accepted and applied for what it is worth in the search for the mental elements" (p. 34); "psychology prefers to work with as few tools as possible, and sensation alone, or sensation and affection together, seem to give all that it requires for the work of analysis" (p. 36). We venture to think that from this point of view the essential features of thinking—recognition, consciousness of meaning (especially general meaning, as in the concept), consciousness of relation — are problems unsolved and perhaps insoluble.

§ 7. *Intellect and Intelligence.*—The word intellect is used as denoting the distinctively human tendency to strive after and build up systems of thought founded on abstractions drawn by the human mind from the chaos

of the sense world. An intellectual man is a man who lives in ideas: he may be very unpractical, very stupid even, in connection with the ordinary affairs of life, but he is generally treated with respect, for most people feel that there is something in him which is on a higher plane than the ability which leads so often to worldly success. This respect is often mixed with contempt because of the apparent inability of intellect to grapple with the ordinary situations of life. The gardener who worked for Charles Darwin is reported to have expressed commiseration for his master, "always mooning about doing nothing."

The word intelligence is used to denote a disposition common to both human and animal life. This disposition shows itself in the ability to cope successfully with new situations, a readiness to think of possible solutions, a quickness in rejecting any that are unsuccessful, a readiness to apply thought constructions to the external world. Possibly the psychological disposition underlying intelligence and the psychological disposition underlying intellect are not two but one, intellect denoting the disposition itself, and intelligence denoting the disposition in its active manifestations. This distinction certainly does not always hold, for intelligence as well as intellect is regarded as something permanent, something that we have even when we are not using it. Perhaps the distinction is rather to be found in the field in which the power is exercised, as has already been suggested in our discussion of the meaning of the terms. This distinction is certainly important, and finds itself reflected in the definitions of intelligence by those psychologists who have dropped the use of the word intellect altogether. One school defines intelligence as the power of abstract thinking,

the power of reasoning; whereas the other school defines it not in connection with thinking but in connection with acting; and regards it as the power to cope successfully with a new practical difficulty.

We find these two points of view reflected in the various attempts which have been made *to measure intelligence.* Certain workers—*e.g.*, Burt with his reasoning test and Terman with his vocabulary test—aim directly at testing intelligence in the realm of abstract thinking; whereas Porteous with his maze tests, and Healy and others with their form boards and puzzle boxes, present to their subjects practical problems which must be solved by manipulation allowing of more or less trial and error procedure.

From time immemorial man has had cause to take stock of his fellows, to realise differences of intellectual power among them. Into such judgments the personal factor entered to a great extent: there was none of the exactitude, the consistency, the reliability that we associate with the term measurement. In the attempt to meet these requirements of science the pioneer was Alfred Binet, whose Scale for measuring intelligence has become widely known. His two great contributions to the solution of the problem are the concept of *mental age*, and the method of standardising the tests.

Every one has three ages, a chronological age determined by the date of his birth, a physical age which at present is merely a rough average of several growth factors which to a considerable extent are independent of one another, and a mental age which nowadays is determined by the application of certain tests. Clearly these tests cannot be arbitrarily selected, or we should have only the rough estimate already referred to. They must be tests from which we know

what to expect in ordinary circumstances. In other words, they must be standardised tests. The plan that Binet adopted to standardise the tests was this: he went to the ordinary elementary schools in Paris and he asked the teachers to let him interview children of normal mental development—that is, children who were neither advanced nor retarded as to their class in school. Previously to this Binet had worked along with Dr Simon in the Hospitals at the problem of distinguishing between the backward and dull child on the one hand, and the mentally defective child on the other. In the course of this work he had hit upon certain questions which seemed to him to throw light on the amount of a child's intelligence. These questions he now tried upon the normal children he obtained in the schools. If in applying a particular question to all these children he found that the percentage of satisfactory answers steadily increased with the chronological age, he was satisfied that the test was a real test of intelligence. When he reached the age at which practically all the children passed, he regarded the test as suitable for that age.

In 1905 Binet published a set of questions arranged in order of difficulty as established by his researches, and aiming chiefly at enabling teachers to find out when a child's development had proceeded far enough to allow it to pass from one department of the school to another. In 1908 there was published the first Scale, in which we find questions assigned to the different age levels from three to thirteen. In 1911 a revised version was put forth, modified in accordance with criticisms and his own further testing. This may not, however, have been in all respects an improvement on the earlier version. The

practical value of the work was by this time being widely recognised, and workers all over Europe and America were taking it up. A very extensive revaluation of the tests and reorganisation and extension of the Scale was undertaken in Stanford University, California, under the guidance of Professor Terman. The revision thus obtained is known as the Stanford Revision of the Binet-Simon Scale for the Measurement of Intelligence. With some slight alterations made arbitrarily to suit English conditions (*e.g.*, names of American coins changed into those of British coins of approximately equal value) this Scale is now widely used in this country. An independent revision worked out by Dr Cyril Burt on London children is to be found in *Mental and Scholastic Tests*, a report on the subject prepared for the London County Council.

The Binet tests have to be applied to one child at a time. The examination may last about an hour. The desire to make use of psychological tests in the case of recruits for the American army during the war led to a great development of *group tests*—that is, tests which can be applied to great numbers of people at the same time. Nearly two million recruits were tested, and since then an annually increasing body of children, students, and other young people are being tested all over the world. The interpretation of the results that are being obtained gives an interesting field for research. Considerable discussion has, for example, centred round the discovery that after the age of sixteen increasing years make practically no difference to the averages obtained. In other words, intelligence as tested by the tests seems not to develop further after this time.

It has become customary, instead of making use of

the mental age of a child as representing his intelligence, to express one's results in the figure known as the Intelligence Quotient—*i.e.*, the ratio between mental and chronological age. Now in cases when children are retested after an interval, it has been found that the Intelligence Quotient shows a high degree of constancy. This suggests that perhaps intelligence does not really develop at all, but depends on an innate factor or factors which, as experience increases, function in a wider and wider area.

When we attempt to *define intelligence* in terms of its functions we come, as we have seen, on serious differences of opinion among psychologists. When we come to attempt to define it in terms of its nature, in terms of what fundamentally it *is*, matters are not much better. The main theories put forward may be grouped under three heads: (1) Intelligence may be regarded as a single ability which functions in all intelligent acts; (2) Intelligence may signify a group of general abilities (*e.g.*, memory, attention, &c.), which function together in so-called acts of intelligence; (3) Intelligence may really be a compound of a great number of abilities all highly specific. Professor Spearman holds that there is a unitary factor, which he represents by the letter *g*, which functions in all acts of intelligence. This view apparently is not necessarily inconsistent with the view that there are specific abilities as well. Maxwell Garnett recognises another central factor, *c*=cleverness or the tendency to associate by similarity. Binet distinguishes three factors or phases: (1) The power of the thought process to take and maintain a definite direction; (2) The capacity to make adaptations for the purpose of attaining a desired end; (3) The power to

criticise the results obtained by oneself. This view agrees fairly well with that of Claparède, who recognises three different operations in the movement of intelligence. The first, the point of departure, is the question, the realisation of the problem; the second is the search, the discovery of the hypothesis; the third is the control, the verification of the imagined hypothesis. The theory of specific factors is maintained by Thorndike, but even if there are many specific factors in processes which manifest in intelligence, the high correlation which exists between the results of very various tests of intelligence would make it seem likely that there are factors which function through a wide range of intelligent activities. Dr Ballard thinks that the majority of the theorists would probably subscribe to the following tenets: "Intelligence is innate mental ability which operates in many different ways; it is more fully manifested in the higher mental processes than in the lower; it is specially active in dealing with a situation which presents points of novelty (in other words, with the solution of problems); it is more concerned with the dissecting, planning, and re-arranging of the data of experience than with the mere reception of impressions."[1]

On the subject of the foregoing section, see Terman, *The Measurement of Intelligence*, a practical manual which gives the history and method of the Stanford revision of the Binet scale, with very full directions for putting the tests, and some discussion of results; also *The Intelligence of School Children*, discussing among other things the constancy of the I.Q. and its range of variation; P. B. Ballard, *Group Tests of Intelligence* and *Mental Tests*, two

[1] *British Journal of Psychology*, October 1921.

books simply and interestingly written, mainly for the use of teachers; Cyril Burt, *Mental and Scholastic Tests*, a mine of information and suggestion; and the Report of the Consultative Committee appointed by the Board of Education to consider the tests and their possible use in a system of education, published in 1924 under the title *Psychological Tests of Educable Capacity* (H.M. Stationery Office). See also ch. ii., § 4, above.

CHAPTER XV.

THE SELF.

As the acorn "tends" to grow into an oak, as the tadpole to turn into a frog, as the cub to become a lion, so in the human infant exists a "tendency" to grow into a man. But unless circumstances are favourable none of these tendencies will be carried out; and the more favourable the circumstances the more completely will they be carried out. Even in the most favourable circumstances we do not suppose it possible for every seed to grow into a perfect plant; no more do we suppose that every infant, if placed in suitable environment, could grow into a Shakespeare or an Aristotle. The greater the complexity of the adult form to be attained, the greater is the variety possible in the standard attained. In man, as the most complex of beings, the variety of possible attainment reaches its height.

§ 1. *Personal Identity.*—This idea of tendency involves the idea of process in time—*i.e.*, of change. We

talk of the identity of the self, but if the self at any moment is simply the culmination of a complex process which has been going on up to that moment, then the identity belonging to the self cannot be an identity implying sameness. The identity is one of continuity; each self passes imperceptibly into the next, the change being so gradual that it is rarely detected at the time; although a very great difference may be perceived if we compare ourselves as we were at fifteen with ourselves as we are at thirty. The latest self contains all the previous selves in the sense that their experiences are known by it and welded by it into its life. Even in the case of forgotten experiences—as in the lost life of our childhood—we may still say that the present self contains the previous selves, because the effects of these experiences persist. "Our delight in the sunshine of the deep-bladed grass to-day might be no more than the faint perception of wearied souls, if it were not for the sunshine and the grass in the far-off years which still live in us, and transform our perception into love."[1] The present self is different from what it would have been had the past selves been different. "The past that is forgotten is not necessarily lost. In some form, by some method, we continue to profit by that experience, and it is more important to have had a good past than to be able to recall it."[2]

The sense of our personal identity is no doubt closely correlated with memory. But memory is the precondition of any mental life at all—even sensation, as

[1] George Eliot.

[2] "Place of Mental Imagery and Memory among Mental Functions, by F." Kuhlmann, *Amer. Journ. of Psych.*, vol. xvi.

we have seen, seems to demand the action of a summation of stimuli involving what has been called organic memory—so that we need not elaborate this point. It is patent to every one that the fact that the experiences of our past selves rise in us still, as it were, warm with the emotional fire which once surrounded them, is the fact on which we mainly base our claim to what we call personal identity. This memory of ours is not always true to the actual course of events. We sometimes invest our imaginations with so much emotional tone that we incorporate them as actual experiences into the life of the self. Thus it is not uncommon for children to assert positively that they were present at incidents that happened before they were born.

The sense of personal identity, then, involves at least the sense of continuity, and the warmth of appropriation which invests what we call our memories.

The more fundamental of these conditions is memory, for, so long as memory is intact or nearly so, the sense of personal identity can persist through very serious breaches of continuity. Thus if we lose ourselves when we are racing along through beautiful country in a motor-car, and wake to find ourselves in bed with a body full of pain and swathed in bandages, there is an absolute break in the continuity of consciousness,—our surroundings have altered in a way of which we can *give no account, and our organic feelings have become* such that we fail to recognise them as our own. But if memories—which we recognise as memories—come flowing into our mind, we consider that we are the same selves. Sudden conversions, the change in self-feeling consequent on a mental shock or that brought about by champagne or opium, are examples of breaches in continuity, but although in these cases people sometimes

say, "I feel a different man," they never seriously mean, "I am a different self."

We have spoken above of "selves,"—of one self absorbing those which have gone before. The question then arises—Is there a succession of selves, or have we any reason for supposing there is one self which has a continuous existence through time?

Before we attempt to answer this question, however, we must make clear to ourselves, as far as possible, what the term self denotes.

§ 2. *Meaning of the term self.*—A very important part of a man's self is his idea of his body and of how it is clothed. If we believed that one of our limbs had been removed, even although we were suffering no actual pain or inconvenience from the fact, yet our self would undergo a change of a painful nature. In every forecast of the future we should be stopped short by the reflection that we could no longer count upon our body as we had been wont; and these stoppages in the course of thought would be just as disconcerting as the incapacity experienced in our active life. Rags and squalor lessen most men's self-respect; they bring about a shrinkage in the self; while, on the other hand, Mr Holmes, the London police court missionary, tells us he has seen more than one man find salvation in a well-made, nicely-fitting suit of clothes.

Again, these things form part of the self in the very important sense that they come to represent its activity. As a periwinkle builds its shell so that it cleaves to its pulpy organism more closely than a silken glove to the hand, so does man's mind mould his body to express his temperament, and in a wonderful way even his most fleeting thought. The eye brightens with joy, clouds with grief, hardens with anger; every muscle we possess

lends itself automatically to express the life of the mind. Clothes in that they are separable and easily altered afford even more evident scope to activity—here, however, limited in some degree by our social instincts. In this sense, perhaps the most intimate and dearest part of the self is the work of our hands or of our brains. Who has not sympathised with poor Mrs Tulliver in her lament—"To think o' these cloths as I spun myself, and Job Haxey wove 'em, and brought the piece home on his back, as I remember standing at the door and seeing him come, before I ever thought o' marrying your father! And the pattern as I chose myself—and bleached so beautiful, and I marked 'em so as nobody ever saw such marking—they must cut the cloth to get it out, for it's a particular stitch. And they're all to be sold—and go into strange people's houses, and perhaps be cut with the knives and wore out before I'm dead."

Here, as on every other level of mental life, we find action and reaction between the self and the world. In and through its action on the world does the self develop. Manufactories, schools, armies, nations, are examples of organisms by means of which a man may express himself as he does through his own body. The desire for power is an expression of the instinct for self-assertion; and as the power grows, and with it the sense of responsibility to and for others, so does the self grow to keep pace with it. The more scope we have for self-expression the more self, as it were, do we find we have to express. All our possessions are valuable to us only because they give us this scope. Hence all that we call ours—what we have inherited no less than what we have made,—our land and gold, our house and furniture—goes to swell our sense of self. And these things, no less than what we have ourselves created,

have on us a formative influence. Thus Tennyson's Lady Clare, brought up in the traditions of an ancient and honourable name, shook herself free from the stain of her birth by her uncompromising loyalty to those traditions. Beliefs of this nature, instilled into us from our childhood, become habits of thought; they may be ungrounded in fact, as was Tom Tulliver's belief in the stability of his father's fortune, but they are so inwoven in the fibres of our being that any violent alteration of them seems to change our very self.

And yet in all ages the man who reflects has cast these things out of himself. "When anything shall be reported to you which is of a nature to disturb, have this principle in readiness, that the news is about nothing which is within the power of your will. Can any man report to you that you have formed a bad opinion or had a bad desire? By no means. But perhaps he will report that some person is dead. What, then, is that to you? Or that your father is planning something or other. Against whom? Against your will? How can he? But is it against your poor body, against your little property? You are quite safe; it is not against you."[1] We form ourselves upon the world, and when we reach the stage of reflection—a stage which is of course not reached at all by many human beings—we reject the world, as the child, when he becomes a man, puts away childish things.

We have so far considered man mainly as an individual, but it cannot have escaped the reader that whenever we come to consider any extensive human work we have to bring in his relations to his fellows. Indeed much of the value of our possessions to us is derived from the fact that they conduce to our importance in the eyes of others—to what has been called our

[1] Epictetus.

social self. We know that any one whom we meet forms from our appearance, our conversation, our acts, a certain idea of us, and to a greater or less extent retains this idea as part of his mental furniture. In these ideas we take the greatest interest, and we have a desire, which may be exaggerated into a mania, that they should prosper—*i.e.*, that our friends should regard us with affection or even admiration; nor would we willingly do anything that we feel would justly lower their confidence in us. We try to live up to those ideas, and to some extent even mould ourselves upon them. "We are different with different friends; yet if we look closely we shall find that every such relation reposes on some particular apotheosis of oneself: with each friend, although we could not distinguish it in words from any other, we have at least one special reputation to preserve: and it is thus that we run, when mortified, to our friend or the woman that we love, not to hear ourselves called better, but to be better men in point of fact."[1] Again, we have an idea of our own selves, and when our conduct is inconsistent with this idea, then our self-feeling undergoes a change. This change may be either painful or pleasurable; we may yield to a sudden temptation, and shame or remorse may result; or in a crisis we may act with a promptitude and self-control of which we did not think ourselves capable. This idea is an intellectual representation of fact, affected in most of us by emotion, but one which may be *more* or *less* true. There is nothing necessarily moral about it; we may be pained because we show ourselves not so sharp as we thought we were, just as really as because we have shown ourselves less magnanimous than we thought we were. In a society of

[1] R. L. Stevenson.

thieves he who lets himself be caught is the mortified man.

This idea of our self as we are must be distinguished from our ideal self—the self we desire to be. In cases where growth is still going on, the idea continually approaches the ideal, but rarely and momentarily reaches it. Yet the ideal must be reckoned as an important part of the self, for in a strong character it is the most powerful of the inner motive forces, and so determines conduct. The formation and consolidation of the highest attainable ideal for the individual in that individual is the most important problem of the educator. A factor which grows with our growth and changes as we change, it is in its highest form necessarily a product of somewhat late development, and it rarely becomes so consolidated as to cease to be liable to be mastered by the overpowering needs of the organism.

We have already pointed out that the conflict which arises between our various desires or interests tends to arrange them in a sort of hierarchy, those which seem to us of less importance being subordinated to those which seem of more importance. The ideal self is composed of the ends implied in those desires, and hence is frequently self-contradictory until the hierarchy is formed and the less important sacrificed to the more important. Because of the limitations of our finite humanity, this often involves mutilation. A man who has a very wide circle of interests is often prevented from attaining the heights he might in any one pursuit, either because he lacks the clear-sightedness to see that mutilation is necessary, or because he lacks the courage to perform it.

It may be objected that not one of the things yet

mentioned really *is* the self. They may be factors in it in the sense that they affect it, but it is in its own right something other and more than they. The very fact that these ideas of the self held by others, and even by oneself, may be true or false, implies that there exists a reality to which they more or less adequately correspond. This reality is to be found in what we have called psychological dispositions, the bodies of knowledge, the habits of thought, feeling, and action in their sum total,—these form the self. The expression or partial expression of these required by the conditions of the external world at the moment is to be found in consciousness, but they are in their entirety far wider than it. We have already pointed out, with respect to the emotions, that a disposition of this kind, even although it can never in its entirety be in consciousness, is yet to be regarded as stronger than the most violent passion of a transient nature, because it has a more permanent effect upon our life—*i.e.*, it is actually a part of the self; whereas the transient emotion is merely a partial and inadequate expression of the self—an expression which may indeed be so inadequate as to be in effect a lie. Consciousness may be called the doorway of the mind or self; it is the way *out* and the way *in*, but it *never* opens so wide as to reveal the whole of the mind at once. This is an ultimate truth in human experience; it is obviously closely connected with the limitations which we found to be characteristic of the attention process. We are in the habit of regarding consciousness as the highest manifestation of mind; many philosophers have laid so much stress on it—owing to their definition of mind as a thinking (*i.e.*, conscious) substance—that they have tried to show that it never entirely ceases; that it persists faintly through the soundest sleep and

the deepest trance. The evidence seems to us entirely against this theory; but, even if it were true, still we cannot but admit that the greater part of the mind or self is at any given moment not in consciousness; hence the question whether consciousness is or is not continuous in time cannot have anything to do with the question of whether the self is or is not continuous in time. When we come to take up this latter question, we shall, however, have to touch once more on the relationship of consciousness to the self.

§ 3. *Development of the self.*—We have already incidentally seen something of the course of the development of the self. We have seen that we connect together our sight, touch, smell, and taste sensations in such a way as to form "things"; whereas in the case of such humble animals as the fish, the power of mental construction is so low that the smell of food is never conjoined with its appearance in such a way as to form the idea "worm"; each sensation maintains its distinct existence in its own right. We have seen how, amidst the child's perceptual world, his own body holds a unique position,—because of the general body sense which is always present to consciousness, because of the phenomenon of "double touch," and because of the fact that anything coming into visible contact with the body always gives rise to sensation. As by aid of these sensations the bodily area is marked out, the child identifies himself with this particular percept whose vicissitudes affect him in such an altogether peculiar way. His own activity, which brings all parts of his body, so far as is physically possible, into contact with one another and with other things, and which in so doing floods him with kinæsthetic no less than with

external sensations, is evidently the main agent in this learning process.

By the association of the experiences of the divers senses the body becomes a "thing" in a world of "things," and because the body has an inner life which is the child's own, so is he apt to attribute an analogous psychic life to the other "things." The irresponsiveness of most things to his caresses or his violence prevents this supposed inner life taking very definite form: in the case of some children brought up in matter-of-fact households, possibly the belief scarcely ever plays a part of any importance in their world scheme. But there are perceived objects which respond very definitely to his actions; these are persons and animals. He may beat the table as long as he likes, but if he beats the cat it will run away or perhaps turn and scratch him. If he fondles his mother, he is himself caressed in turn; but if he fondles his toys, no responsive movements follow. By his mother or his nurse his desires are satisfied or thwarted; he is fed when hungry, warmed when cold, helped to walk and prevented from dabbling in the puddles dear to his soul. In such ways he becomes conscious of himself as one among a number of living beings whose acts form an inter-related whole, one supplementing and completing, furthering or thwarting the other.

But it is not only by this implicit reasoning process that the child comes to know himself as a member of a society. Into the abyss of time behind him stretches the far line of his ancestors, who yet speak in him and in whom his being is rooted. It is in virtue of his social qualities that man has established himself as lord of this earth; and long before he had arrived at a consciousness of self or of others as individuals, he was

wont to *act* as a member of a community. The animals of a herd will trample the life out of one of their own kind that has been hurt, not from any ill-will to it, but simply because the cries of fear and pain and the smell of blood impel them to make a concerted attack on whatever seems most closely associated with those ill-omened sensations. It is to this habit of concerted action that the preservation of the weaker species has been due; and the purely instinctive and unreasoning social reactions which form part of the nature of childhood still play their part in teaching him, as self-consciousness arises, to know himself as one of a number whose nature and interest are one with his own.

At the stage that civilisation has now reached, knowledge has ceased to be the property of man and has become that of mankind. The whole cannot now be grasped by any one man; but, crystallised by means of literature into a permanent form, it remains accessible to all minds that have developed far enough to make any portion their own. It is the common heritage of us all, but only by our own effort can we enter into possession. In his first stumbling steps towards knowledge all the child's impulses play a part; but the most important part falls to imitation. An act performed by another may, as we have already seen, so dominate the consciousness of children at a certain age that they invariably copy it. Such sensori-motor acts Professor Stout ascribes to spontaneous imitation; but at an early age the child begins to perceive the end of the adult's act, and to adopt it as his own end. He then imitates the act with the view of attaining this end. This Professor Stout calls deliberate imitation. As the child grows, memory comes into play, and he imitates acts which he has seen in the past: thus he takes hold of your wrist and pretends to look at a watch as he has seen the

doctor do; here he is imitating a copy in his own mind, and is thus entering on a higher phase of self-activity. At this level also spontaneous and deliberate imitation may be distinguished. Association may call up the idea in the child's mind; thus the sight of a doll in its cradle may revive the memory of the doctor's visit to baby, and this idea may pass straight into action in the normal way. Or the child, having found pleasure to result from the game, may watch the doctor with a view to playing his part more exactly. The idea is then deliberately set before himself as a copy, and he endeavours to mould himself upon it.

In this process of imitation the child not only adds to his ability to do, but he also increases his feeling-experience. When he gravely shakes his head over the sick doll, he enters in some faint degree into the feeling of the physician. But by far the greater part of his education in feeling comes to him by way of that direct spontaneous imitation which is part of his social heritage. When awe or reverence or fear is felt by the adults around him, the little child thrills in response, and in this way he shares an experience which would otherwise be far beyond him.

In human progress incomparably the most important factors are language and literature. The early use of language is due to spontaneous imitation. The mother makes sounds for her child, and the child imitates as nearly as he can. The sounds generally used, such as bow-wow, gee-gee, &c., are always made when the child's attention is directed to certain percepts; these percepts themselves, from acting as stimuli invariably along with the word-stimulus, come in time to call forth the appropriate sound from the child by themselves.[1] This

[1] Probably these sound responses may be at first reckoned among the conditioned reflexes of which, no doubt, many are established within the child.

spontaneous naming of the object is greeted with social approval, and the connection between name and object becomes fixed. Words come to be used to indicate desires by the same process of imitation coupled with memory; and the success attending this proceeding strengthens the connection formed between things or acts and words denoting them. The use of language being thus discovered, the child combines deliberate with spontaneous imitation. He demands names tirelessly, and practises his vocal organs in every delicate combination. By the help of language he assimilates in a few short years a large proportion of the knowledge which his predecessors have slowly wrung from reluctant nature. When Pythagoras discovered a new truth in geometry, he sacrificed an ox to the gods; now this precious bit of knowledge is the stale of every schoolboy. Literature enables every man to take his stand on the work of his predecessors, and begin where they left off. Hence civilised man has an incomparable advantage not only over the animals but over other men. It is this building up of the common knowledge of the race that has enabled him to rule his environment as efficiently as he does. And were science properly organised, were the questions which we are still putting to nature properly drafted, were the workers at each point in constant communication with each other, were all the progress made systematically collated and compared and rendered accessible, were there buildings fully equipped with apparatus affording every facility to trained workers and for the training of others, then the conquest of nature would proceed with far greater rapidity than it does. We are, it is true, slowly advancing towards this ideal, but its attainment is still far off.

Now all this knowledge of the nature of the world

finds outward expression in railways, telegraphs, houses, furniture, pictures, sculpture, in all the infinitely various ways in which man seeks either to mould his environment to his desires or to express his own nature. The child grows up with these things forming part of his world; he could not himself make a steam-engine or build a bridge, but the power which these things confer on him is counted on in all his acts and thoughts; the individual self is expanded by its use of the collective work of mankind.

Again, in the individual self, knowledge exists as an organism; it forms part of a living, growing mind, and it can be healthily added to only by a process of growth, not by a process of accretion. From this fact spring two results: first, that only through activity of the self can knowledge be increased—a thesis which has already from other premises been abundantly made plain; and second, that there is a continuity in knowledge—that what has been appropriated already determines what can be appropriated now. In illustration, think of a new Act of Parliament. Only the man who knows the Acts which already bear upon the persons affected, only the man who is intimately acquainted with many individual cases of their action, can properly estimate the scope and bearing of the new Act. It is the same with science: no one could understand the meaning of Ramsay's discovery of argon who was unacquainted with Mendeléeff's law of the elements;[1] to most people it was simply the

[1] In 1869 Mendeléeff pointed out that if the chemical elements are arranged in the order of their atomic weights the same properties recur throughout the series. To make this law of periodicity evident among the elements then known, various gaps had to be left. It was prophesied that elements would be discovered which would fill these gaps, and which would have certain definite properties indicated by their position in the series. Argon is one of the elements thus foretold.

separation of a distinctly uninteresting body from the rest of the atmosphere; to chemists it was a cope-stone for their intellectual construction of the universe. New discoveries are made by men who have assimilated to themselves the work which has already been done, through their grasp of its implications. In primitive times chance experiments may sometimes have been happy, but now fruitful experiments are not directed by chance, but spring from and presuppose a large body of knowledge already established. In the same way individual advances are made by the mind reaching out from the level already attained; all ideas as they enter consciousness are modified and transformed by the nature of the receiving mind. Thus children never receive ideas as they come from their teachers; could the mind of the teacher and the minds of the class all be laid open to our inspection when a lesson is going on, it would be a revelation in psychology. Indeed we may generalise this saying, and affirm that no one ever receives the thought of another as that other thinks it. It must have happened to all of us to read a book with the greatest enjoyment and profit, to feel that it has widened our horizon by raising us above our previous level, and on returning to it a few years later to find ourselves greatly disappointed, and unable to tell what we saw in it before. The reason of this is that we have actually taken from the book on first reading all it had to give us; we have since, by its help, grown past it, and hence find it now unproductive. The master books are those which are always above us, but which present something which can be taken hold of at every stage of development.

Most of our knowledge takes the form of a representation of the external world; and this knowledge we hold in the form of belief. Belief is the primitive state, and is limited only by the nature of the mind which

prevents the entertainment of contradictories when recognised as such. Childhood tends to accept everything at its face value; it is only after the mind has been at work analysing and connecting that contradictions are discovered, and hypotheses evolved to make them disappear. To give an obvious instance: colour is supposed by children to be inherent in things themselves; light simply reveals what is already there. But different lights—*e.g.*, gaslight and daylight—show different colours, and how could this be if colour were actually in the object? New explanations must be advanced to meet these difficulties; and so sense phenomena in time come to be, as it were, supported on a mighty connected framework of hypotheses which render them consistent with one another. On these beliefs we act, and in so doing test them; if our expectations are not fulfilled, we remodel our beliefs. This process of testing and reconstituting continues to some extent throughout life; there is always what may be called a "fringe" of belief which we hold loosely, and which may be altered. As we grow older, however, the core of our belief—the part which has been tested and re-tested, and which is inwoven with all our habits of action—becomes such a fundamental part of the self that we are incapable of reconsidering it, and any new applicant which conflicts with this firmly established centre is instantaneously ejected from the mind.

With regard to inanimate nature, beliefs do not affect facts,—you may trust the heavens not to rain upon your picnic party, but they will do so all the same. But with respect to your social environment beliefs do affect facts. Belief in the kindness of your fellow-men will often beget kindness; belief in their selfishness will beget the vice which it affirms. Thus people who have different beliefs live in worlds which are different in point of fact. But as

one disappointment will do more to overthrow than ten confirmations will do to strengthen belief, it is of great importance that children should never be harshly or unjustly treated, that so they may preserve that ready trust in the goodness of the world which tends to bring about its own fulfilment.

The self as thus conceived is a complex organism, finding a more or less adequate expression in consciousness and in action on the environment. The power of self-expression is not always justly proportioned to the nature of the self. The adolescent, for instance, often has surges of feeling and vague thought which he does not wholly understand, and which he is powerless to let forth in word or action. People who are dubbed cold and self-restrained are really often the victims of a similar inhibition; their emotive potential is higher, so that they do not "go off" so easily as their so-called more emotional brethren do.

§ 4. *Moralisation of the self.*—Even this brief account of the development of the self makes it clear that that development is very largely dependent on the nature of the social environment. Children spontaneously vocalise, but they learn language from others. In the same way because of their extreme suggestibility and their ignorance they will adopt unquestioningly the beliefs of those around them no matter how superstitious and even absurd these may be. Again the child's characteristic attitudes and modes of behaviour are largely determined by the dictation of others. A child who is constantly told he is naughty becomes naughty. A naturally timid child has his timidity increased by constant comments on it. One might suppose that to *call* a timid child brave might bring about in him the desired attitude. But education must proceed cautiously here, because if an ideal which his innate tendencies render too difficult of attainment

be instilled into a little child, then inner conflict of a disastrous nature may ensue.

The process of education many people regard as a process of moralisation of the innate tendencies—*i.e.*, their direction towards social and not merely personal ends. In this process rewards and punishments are thought to play an important part; by their means social or altruistic modes of behaviour become pleasurably tinged, and so in course of time come to be preferred apart from reward; anti-social modes of behaviour become painfully tinged and consequently are avoided. Rewards and punishments are often simply appeals to our "lower" nature, our self-interest; as when a child is rewarded by a sweetie or rebuked by a slap. Such training frequently degenerates into bribes and threats—promises which may or may not be fulfilled, and is to be condemned in the strongest terms as not only non-moralising but actually immoralising in tendency. The child of three who defies his mother has often been brought up on these lines.

The child requires to be taught and guided, not forced. The discipline of fear is a bad discipline. For the first couple of years the child's conduct is easily directed by the mother, who enlists on her side the law of habit. In the third or fourth year one often observes a rapid development of the instinct of self-display which sometimes may give rise to very great difficulties. This instinct finds its satisfaction in notice; hence, if a great fuss is made about a child's misdeeds, especially if his crimes are recounted in the presence of others, it is found that he repeats his offences and goes from bad to worse. In some children punishment has no effect whatever unless to increase the trouble, for punishment is taking notice and so gratifies the instinct. Psychological laws would suggest that in the interests of moralisation

more notice should be taken of good conduct than of bad conduct; it is unfortunate that the opposite course is so common.

In the various stages of purposive striving through which the individual passes on the way to completely moralised conduct, McDougall distinguishes at the upper end of the series (*a*) "conduct of the lower level, *i.e.*, instinctive desire regulated and controlled, in the choice of means, by anticipation of rewards and punishments"; (*b*) "conduct of the middle level, *i.e.*, the same instinctive impulses regulated in the choice of goals and of means by anticipation of social approval and disapproval"; (*c*) "conduct of the higher level, *i.e.*, striving regulated in the choice of goals and means by the desire to realise an ideal of character and conduct, a desire which itself springs from an instinctive disposition whose impulse is turned to higher uses by the subtle influences of organised society embodying a moral tradition."[1]

This analysis gives countenance to a dogma which is prevalent at present, and which we believe to be profoundly untrue. It is that the child is essentially egocentric; *i.e.*, that he aims at the satisfaction of his own desires and impulses with absolute disregard of the well-being of other people. To show to what an extreme this dogma has gone, we cite the following: "A young child's mind is remarkably animal—in its simpleness, its utter selfishness, its unrestrained manifestation of its feelings, its likes and dislikes, its senseless cruelty, its desire for immediate gratification."[2]

These words are written by some one who has never really studied a normal baby. There may be children of three or more who at times correspond to such

[1] McDougall, *Outline of Psychology*, ch. xvii., p. 449.

[2] William Caldwell, M.D., *Journal of Mental Science*, January 1925 (see also ch. viii., § 5 above, p. 236).

descriptions; but they are children already injured by the educative process. The normal baby has neither a self nor a centre, save in potentiality, and he has within him tendencies which, if properly guided, will make others the centre quite as much as the ego. Because of the innate tendency to be infected by the emotions of others, the life of the infant centres in that of his most constant attendant, his mother or nurse. In fortunate circumstances a relation establishes itself by means of which the baby wonderfully quickly takes his place on the second plane of conduct. As his understanding increases, he maintains this place by the power he has of projecting himself into the circumstances of others: he suffers with their suffering, and actively strives to remove it. When he reaches an age at which this extension of himself into others is made by means of literature, he finds his strivings to help abortive, and he may come to enjoy the emotions aroused in himself, even if sorrowful, as an experience. In such cases there is danger of the moral sentiments limiting their expression to the sphere of the emotions.

The well-born child—the child who is fortunate both in nature and nurture—at a very early age becomes a moral being so far as his behaviour is concerned. This may be termed habit morality, and no one has doubted that it is a legitimate and desirable stage in the progress towards real morality.[1] Morality which arises from fear of punishment may be termed slave morality, and in our opinion is not a necessary stage in moral development at all. In fact the introduction of the fear element is

[1] There are people who seem to think that effort is an invariable accompaniment of moral conduct. Such people are quite consistent when they allow "ill-born" children to grow up in surroundings which inevitably produce bad habits. The moralisation of these children will certainly demand great efforts on their part, and it is a very remarkable thing that it ever takes place.

probably a hindrance to the attainment of the highest level of moral conduct.

In illustration of what has been said, the following observations may be given: When baby was about fourteen months old, some drops of boracic lotion had to be put in her eyes. One night her mother was also treated. Baby watched solemnly. When her mother sat up, and the clear drops rolled down her cheeks, baby wept, then went close to her and "loved" her, putting her little face against that of her mother.

In her twenty-third month the same child had taken an advertisement book from the wastepaper basket. She held one leaf as if about to tear it, but paused and looked in an inquiring way as if to say, "May I?" In the same month she pulled a red book from the book-shelf—a thing she was not allowed to do. She then said "No" very emphatically, and tried to put it back. These cases seem to show how very early the higher kind of morality may begin to be established. There was certainly no fear of punishment in this child.

Jackie, a four-year-old, whose wilfulness and caprice reflected the nature of his home training, was one day slapped by his teacher, whose patience he had for once exhausted. So far as pain went, the slap was nothing. We have no doubt that at home he received thrashings to which he responded by defiance. But on this occasion he burst into tears, threw his arms round his teacher's neck, and for some time afterwards could scarcely bear to be separated from her. Does this instance, which is not exceptional, but typical, not suggest that fear is a poor influence in comparison with love?

The second instance given above seems to indicate that even at that early age ideals of conduct are being formed and are beginning to function—*i.e.*, that even the very young child *attains at times* to the highest level of conduct. Before conduct can be *maintained* on this level, it is evident that there must be a great increase in knowledge, in the power of self-criticism,

and in extent of intellectual grasp. In so far as conduct on this level implies independence of social approval and disapproval, it is probable that very few people ever fully attain to it. Of course many people can accept and practice an unpopular morality, but unpopularity brings its compensations in the notice that it entails. Moreover, there is usually an inner ring of sympathisers whose approval and admiration give the support required.

So long as the society whose approval and disapproval determine conduct is a living society, a society with which the individual comes into intermittent contact, so long is his morality an unstable morality. Hence the danger of "bad company"; especially if with low moral standards are associated qualities of intellectual brilliance and social charm which awaken admiration.

A more stable morality is attained when the society whose approval or disapproval matters becomes an ever present actuality in the mind of the child. The impossibility of being found out ceases to be a relevant factor. The religious teaching, even of very little children, is sometimes directed so as to establish a morality of this kind. It is probably better not to over-emphasise the omniscience of God, a doctrine which is beyond the range of the little ones, but rather to encourage them to form their ideals from the great characters of history and literature. Sometimes a child's own forbears—men of his own family or of his own country—are those who in his imagination accept or disown his conduct. Or he may be encompassed by a cloud of witnesses—the great and good of every age and of every clime—and unless he feels at one with them, life is bitter to him. The metaphysical interests of adolescence may cause his morality spontaneously to intertwine with his religion, and in a Christian country the ideal Christ may be the judge whose approval he seeks beyond all other happiness.

According to the general view presented in this book,

the unification of the self is not original but final. It comes about through the development of stable psychological dispositions or sentiments which themselves come to be arranged in a hierarchical order, so that no course of conduct is accepted or "passed" until tested by the master sentiment. The master sentiment is not necessarily moral, but it is generally agreed that the most complete and highly unified character is attained when moral values are incorporated in the master sentiment.

"Human nature is so imperfectly unified," says Professor Sorley, "that a man may show high devotion to one region of values, and treat all the others with neglect and contempt. But he does so at his peril. He loses thereby his chance of developing a complete and harmonious character, and he risks also his perfection in the art or science of his choice. Morality cannot be isolated from any part of life. The ideas of good and evil which direct the lives of men are also formative influences upon their artistic products in picture or poem or building. Nor can knowledge claim to be completely independent of character. Character determines interest, and interest selects its objects and its method. It was not mere fancy that led the sophist and alchemist to hold that the mind that would find out the hidden things of the world must be purged from bodily and selfish desire, and that the philosopher's stone can be touched by none but clean hands."

Such a unified and moralised self is the aim of education. Its semblance may be attained through habits of conduct imposed from without, but its actuality can be attained only by self-education, by the individual's acceptance of ideal ends and incorporation of them in his life's practice. How far in attaining this end the

individual leaves behind him all reference to social approval and disapproval is not easy to say. Many people besides the adolescent incorporate the abstract sentiments in an ideal person towards whom the child-attitude of receptivity and suggestibility is taken up. The demand made at the present day for a personal God is evidence that the strength of moral sentiments consists for most people in a personal relation. "The impulse to pray," says Professor James, "is a necessary consequence of the fact that whilst the innermost of the empirical selves of a man is a self of the *social* sort, it yet can find its only adequate *socius* in an ideal world. All progress in the social self is the substitution of higher tribunals for lower; this ideal tribunal is the highest; and most men, either continually or occasionally, carry a reference to it in their breast. The humblest outcast on this earth can feel himself to be real and valid by means of this higher recognition. And, on the other hand, for most of us, a world with no such inner refuge when the outer social self failed and dropped from us would be the abyss of horror. I say 'for most of us,' because it is probable that individuals differ a good deal in the degree in which they are haunted by this sense of an ideal spectator. It is a much more essential part of the consciousness of some men than of others. Those who have the most of it are possibly the most *religious* men. But I am sure that even those who say they are altogether without it deceive themselves, and really have it in some degree. Only a non-gregarious animal could be completely without it. Probably no one can make sacrifices for 'right' without in some degree personifying the principle of right for which the sacrifice is made, and expecting thanks from it. . . . The old test of piety, 'Are you willing to be damned for the glory of God?'

was probably never answered in the affirmative except by those who felt sure in their heart of hearts that God would 'credit' them with their willingness, and set more store by them thus than if in His unfathomable scheme He had not damned them at all."[1]

That there is much truth in James's contention that morality continues with most men to have this personal reference seems to be proved by the widespread identification of morality with religion.

In considering the question of the moralisation of the child, the student should read carefully McDougall's *Introduction to Social Psychology*, ch. viii. See also Adler, *The Moral Instruction of Children*, in "The International Education Series," a book of much value from the psychological as well as the moral and educational point of view.

§ 5. *Diseases of Personality*.—This conception of the self accepts the principle of growth as fundamental, and with the fact of growth is correlated the possibility of unhealthy growth or disease.

Of late years much interest has been aroused by certain "psychological puzzles" which have been called "alternations of personality." Many cases of this kind are now described in medical and psychological literature. Perhaps the most complete and interesting examples are the case of V. Lois,[2] studied by Bourru and Burot (*Variations de la Personnalité*, 1888), and the more recent case of "Miss Beauchamp,"[3] studied by Dr Morton Prince.

Lois had from childhood been a vagabond and a

[1] James, *Principles of Psychology*, vol. i. pp. 316, 317.

[2] See Ribot's *Diseases of Personality*, where full extracts are given. Eng. trans., pp. 72-81.

[3] *The Dissociation of a Personality*, by Morton Prince, M.D., Professor of Diseases of the Nervous System in Tufts College Medical School; Physician for Diseases of the Nervous System, Boston City Hospital, U.S.A.

beggar. Arrested for theft, he was sent to the reformatory of Saint Urbain. One day on lifting a bundle of twigs he was terrified by the appearance of a viper. Falling ill as a consequence of this fright, he was transferred to the asylum of Bonneval, suffering from paralysis of the lower limbs. Here his character was good, he was grateful and docile; he was taught tailoring, and learned to sew pretty well. After about a year he had a severe fit of hysteria, on recovery from which he was found to have forgotten all his Bonneval life, and to believe himself still at Saint Urbain. He had no knowledge of the doctors and nurses, and his paralysis had disappeared. His disposition was completely changed; he was now quarrelsome, gluttonous, and impolite; he remembered being frightened by a serpent "the other day," and had no idea that more than a year had passed since that event.

Later the youth was dismissed from the asylum, and after leading a wandering life for some time, was taken to Bicêtre, whence he escaped and enlisted in the Marine Corps at Rochefort. Later still he came under the care of Messrs Bourru and Burot, who, by the help of physical methods of transference (magnetism, electricity, &c.), obtained in him six different states, each characterised by a special physical condition and a special memory.

In his ordinary state he now suffered from hemiplegia[1] and hemianæsthesia[1] of the right side. He was talkative, arrogant, rude. He was unable to write owing to the paralysis of his right hand. His memory was very limited, his childhood, his sojourn at Saint Urbain, and the first part of his stay at Bonneval being forgotten. The second state was brought about by the application of steel to the right arm. It is character-

[1] See Physiological Glossary.

ised by paralysis of the whole of the left side, with hemianæsthesia. He is now at Bicêtre; his age is twenty-one; his expression is gentle, his bearing respectful. He never came to Rochefort, and never heard of the Marine Corps. He has very little memory of his earlier life. In the third state there is paralysis of the left limbs, with general hemianæsthesia. The patient's character, language, physiognomy are like those of the second state, but he now believes himself only nineteen years old, hence his memory is more limited. In the fourth state he suffers from paralysis in both the lower limbs; he believes himself at Bonneval, and knows only two places, Bonneval and Saint Urbain; he has forgotten how to read and write, but sews like one long in the business. In the fifth state he has neither paralysis nor anæsthesia; he can read well and write fairly; he is fourteen years of age; his memory is arrested at the viper incident, the mention of which brings on an attack of hystero-epilepsy. The sixth state is in physical conditions like the fifth. Lois is now twenty-two; he reads well, writes passably, but has never been a tailor, and does not know how to sew. His memory embraces his whole life, except the times when he was afflicted with paraplegia at Saint-Urbain and Bonneval.

By hypnotic suggestion the psychic states were then induced directly, and it was found that the bodily states that accompanied them were in each case reproduced. Thus if Lois is commanded to awake at Bonneval when he was a tailor, he awakes with paralysis and insensibility in the lower limbs.

"Miss Beauchamp's" case is briefly as follows.[1] Dr

[1] For an admirable account of this interesting case see *The Contemporary Review*, Feb. 1907. See also Dr Morton Prince's book, *The Dissociation of a Personality* (named above).

Prince was consulted by a lady who seemed to him a neurasthenic of extreme type, and whom he treated, after ordinary remedies had failed, by hypnotic suggestion. After a time in hypnosis a second self appeared, who spoke of the waking personality as "she," had a supreme contempt for her and her "moonings," claimed an independent and coexisting consciousness for herself, and dubbed herself "Sally." Sally knew the thoughts and actions of the waking self—henceforward called B I,—but B I was for long ignorant of Sally's very existence. Sally at first appeared only in hypnosis, but after a time she succeeded in gaining possession of the waking body, and thereafter the two personalities alternated, much to the consternation of B I, who believed that Sally's deeds were done by herself when she had fallen into a trance. One day Dr Prince was summoned to see B I at her own house. He found her evidently suffering from mental strain, and as usual extremely reticent. Very shortly, however, "an extraordinary change seemed to come over her. She appeared natural, tranquil in mind and body, and sociable. All nervousness and signs of fatigue ceased. She . . . chatted pleasantly; in fact, seemed a new character, healthy-minded, and with every bit of reserve gone. I had never seen her so natural and sociably disposed." After a few minutes the doctor discovered that this was really another personality, and thereafter B IV, as she is called, shared the body with the other two. Neither B IV nor B I knew anything of the thoughts or actions of the other, but the memories of both were identical up to a point in Miss Beauchamp's life six years previously; B IV knew nothing of what had happened during these six years, nor had she any of the intellectual accomplishments which B I had acquired during that time. Thanks to

the apparent healthy-mindedness of B IV, Dr Prince was for a time of opinion that she was the rightful owner of the body, and he directed his efforts towards maintaining her in possession. Finally, he came to the conclusion that neither B IV nor B I was a complete personality, but that the real Miss Beauchamp consisted of a fusion of the two, and he successfully directed his treatment towards bringing about this fusion. "Since her coming," says Dr Prince, "the real Miss Beauchamp has talked with me many an hour over her case, and about her life. . . . She has told me frankly about herself, her points of view, her attitude of mind, her feelings and emotions when she was B I, which as B I she never would divulge. She speaks equally freely about herself as B IV. These differences of state seem to her very largely differences of moods. She regrets them, but does not attempt to excuse them, because, as she says, 'after all, it is always myself.' Of Sally, her life and doings, she knows nothing except indirectly. Of this part of her mental life she has no more memory than has B I or B IV."

Such cases as these bring into sharp prominence the complexity of the nature of the self. The gaps in the memory, and the extraordinary variation in the bodily state of the different personalities, show that we have here something which far surpasses any normal change of "mood." But it is doubtless to changes of "mood" that we must look, if we wish to find in normal life any suggestion of an explanation for the puzzling and weird phenomena just described.

We have seen (ch. vi., §§ 1-3) that besides the special sensations which give us knowledge of the external world, we have a general body sense which gives tone to our personality, and which in fœtal life

constitutes practically the whole of it. Into this cœnæsthesis, as this general body sense is termed, special sensations are received, and they frequently form with it strong automatic connections (cf. example on p. 163). Although in general this cœnæsthesis does not occupy any prominent place in consciousness, yet on occasion it colours our experience in such a way as to force itself on our attention. Apart from such extreme cases of alteration in it as those described on p. 152, most people are aware at times of what we may call an exuberance of vitality; they feel themselves more than usually able to cope with their daily experience, their intelligence seems quicker, their energy more than equal to every demand; life has a greater zest than usual, small annoyances cease to annoy, pleasures are more keenly felt. At the opposite extreme we have seasons of depression for which there is nothing in our surroundings to account; the real world seems to recede from us; our pursuits lose their worth. In some people these extremes alternate with more or less regularity, and this striking difference in the cœnæsthesis makes them appear to themselves as well as to others of unstable character.

By many authorities this general body sense is regarded as the nucleus of personality, and to an alteration in it are attributed the most serious disorders of the self. Thus Professor Ribot arranges the diseases of personality in three groups, basing his classification on the amount of organic alteration,[1] thus:—

1. Total alteration of the feeling of the body, which causes new modes of feeling, perceiving, thinking, and so produces a new memory. The memory of the former life may to some extent persist, but that life is felt as

[1] *The Diseases of Personality*, Ribot (Eng. trans.), pp. 133-137.

alien—as having been experienced by some one else. For example: "A soldier believed himself dead since the battle of Austerlitz, at which he had been severely wounded. When asked about his condition, he would reply, 'You want to know how old Lambert is? He is dead; he was carried off by a cannon-ball. What you see here is not he, but a poor machine that they have made, in imitation of him; you ought to ask them to make another.' In speaking of himself he never said 'I,' but 'that thing.' His skin was insensible, and often he would fall into a state of complete insensibility and immobility, lasting several days." (Ribot, p. 32.)

2. Alternations of personality, of which striking examples have already been given. With reference to these cases, Professor Ribot puts forth the hypothesis that "in these patients who are usually hysterical—that is, highly unstable—along with the secondary variations, two distinct *habitus* in the physical life exist, each of which is the basis of a separate psychic organisation."

3. The substitution of personality. Under this heading are included all cases of people believing their condition to be changed, as when a man thinks he is a woman, or a beggar believes himself a millionaire. This form of disorder "proceeds from the brain, not from the lowest depths of the organism; and is rather a local than a general disorder—the hypertrophy of a fixed idea, rendering impossible the co-ordination necessary for the normal life of the mind." It is "not, as in the two preceding groups, caused and supported by a profound modification of the feeling of the body, carrying with it a complete transformation of the person."

For another classification of the "mutations of the self," together with a number of very interesting examples, see James's *Principles*, pp. 373-401.

At present such classifications are at best only tentative owing to the fragmentary condition of our knowledge of the nature of the self. The emphasis laid by most writers on organic conditions, and particularly on cœnæsthesis, may be necessary for the present state of our knowledge, but, as we have tried to show in chap. iii., the ultimate stress cannot possibly fall on the physical side. We may, it is true, image such phenomena as "double" or alternating consciousness as a separation of one set of organised brain tracks from another; but by what fissure or barrier the two sets are thus thrown out of gear we do not know. On the mental side the phenomenon in a small way is common enough: thus the presence of strangers often brings about an inhibition which prevents our "being ourselves," as we put it. Doubtless this has a concomitant physical aspect in brain change; our point at present merely is that the mental side is more intelligible and actually better understood than the physical. Even the change in cœnæsthesis is a mental change just as much as is the hypertrophy of a fixed idea. The difference is only that the former affects consciousness, and particularly the focus of consciousness, in a less striking and—if the figure may be pardoned—a less tangible way than the latter. Changes in the organism are of interest and importance only because they are symbols of psychic changes. Our business is to get as clear an idea as possible of the nature and causes of these unhealthy alterations under both their aspects, but we must never be misled into supposing that organic disorders can, as such, explain or account for mental disorders.

§ 6. *Relation of consciousness to the self; continuity of the self in time.*—We have already separated the

question of the continuity of the self in time from that of the continuity of consciousness in time. We are not disposed to maintain that consciousness is continuous. It is at all events perfectly evident that much of our intellectual and emotional nature is for long stretches of time non-existent, so far as consciousness is concerned. Yet, when called upon, it readily manifests itself directly in consciousness and indirectly by guiding our actions. Consciousness, it seems to us, must for the present be regarded as an instrument in the development of the individual, acting at his point of contact with the environment, and summoning thither all his relevant resources. Much of the perplexity of the early psychologists with regard to this question of the relation of consciousness to the self arose from their assumption that the "soul" is a "simple" substance. Now, nothing seems to us to be more clearly indicated by the whole story of race evolution than that the "soul" of man is infinitely, unspeakably complex. Nor is there any reason to suppose that his consciousness, any more than his self, as a whole, represents the highest possible type of such existence. It is, indeed, perfectly conceivable that the goal towards which we—whether as a race or as individuals—are tending may be a more all-embracing consciousness,—a consciousness in comparison with which that which we at present enjoy may be as the merest flicker of the Will-o'-the-wisp to the full radiance of the sun. But, leaving such speculations aside, we must not in the meantime lay too much stress on the flicker of consciousness we possess, which in its irregularity and its narrowness is palpably inadequate to the self as a whole.

Setting aside the question of consciousness, then, let us turn to the wider question of the continuity of the

self. Professor James maintains that for the psychologist the supposition that there exist individual selves having continuous existence through time is altogether unnecessary. All the phenomena of his science can be accounted for by admitting the existence of certain "streams of thought" or "subjective life." The present thought is not identical with that which is just past, but it, as it were, inherits and possesses it and through it all previous thoughts, which have each as they faded been appropriated by the newly arising thought. The gaps in the continuity of the stream caused by sleep or other periods of unconsciousness might seem to be an insurmountable obstacle to this theory. These Professor James deals with thus: "When Paul and Peter wake up in the same bed, and recognise that they have been asleep, each one of them mentally reaches back and makes connection with but *one* of the two streams of thought which were broken by the sleeping hours. As the current of an electrode buried in the ground unerringly finds its way to its own similarly buried mate, across no matter how much intervening earth, so Peter's present instantly finds out Peter's past, and never by mistake knits itself on to that of Paul. Paul's thought in turn is as little liable to go astray. The past thought of Peter is appropriated by the present Peter alone. He may have a *knowledge*, and a correct one too, of what Paul's last drowsy states of mind were as he sank into sleep, but it is an entirely different sort of knowledge from that which he has of his own states. He *remembers* his own states, whilst he only conceives Paul's. Remembrance is like direct feeling,—its object is suffused with a warmth and intimacy to which no object of mere conception ever attains. This quality of warmth and intimacy and immediacy is what Peter's present thought

also possesses for itself. So sure as this present is me, is mine, it says, so sure is anything else that comes with the same warmth and intimacy and immediacy, me and mine. . . . This community of self is what the time-gap cannot break in twain, and is why a present thought, although not ignorant of the time-gap, can still regard itself as continuous with certain chosen portions of the past."

Now, although psychology may, for many purposes, with advantage limit herself to the study of the stream of thought as such without scrutinising its implications, yet the supposition that the existence of such a stream does not involve of itself the continuous existence of some entity is entirely unintelligible. If consciousness coincided in extent with the self, and if there were no time-gaps, the theory might present a certain plausibility. As things are, each time that we "rack our brains" for a piece of information which is not now in consciousness, but which we know we can bring there, we demonstrate its inadequacy. For this thought that we search for is not "warm," for as thought it does not at present exist. The present thought has never been in contact with it, so how can it even know of it? Professor James's theory really assumes the continuous existence in some form of the past of both Peter and Paul, just as his illustration supposes the actual existence of the second electrode before the current succeeds in reaching it. No theory of the self will ever be intelligible in psychology which does not openly or tacitly assume the continuous existence of the past, and this continuous existence of the past is simply what we mean when we use the term "psychological dispositions."

With the frank rejection of the old theory of the soul as a simple substance and the acceptance of a soul of

infinite complexity, many of the traditional difficulties of philosophy vanish. The self is not a unity; it is full of contradictions, of incompatible desires, of antipathetic tendencies, of feelings irreconcilable one with the other. But its life is a journey towards unification—towards the establishment of an orderly hierarchy. In the individual no less than in the race is there a continual progress from the lower towards the higher; a cutting adrift from the life of the senses to enter into that of the intelligence and the higher emotions. Nor must we complain because failure is possible,—but for the possibility of failure the drama would lack reality. It remains for ever a hope, an aspiration, that he who is baffled and thrown out of the contest in the here and now, may fall to rise, and find the fulfilment of his being in ways which still transcend even the imagination of man.

The theory of personality developed in this book, a theory which regards the unitary nature of the adult self as an achievement resulting largely from purposive striving and conscious realisation of the need for harmony among the more or less conflicting sentiments formed in the course of education and experience, agrees in its main features with that worked out by McDougall in his *Introduction to Social Psychology*, a book which was published just a year after the first edition of this book. In his *Outline of Abnormal Psychology* (published in 1926) Professor McDougall returns to the theory and considers it in connection with the phenomena of dissociated and co-conscious personalities. To his former position, with which, as said above, we find ourselves in substantial agreement, he now adds a proposal which "consists in adopting the monadic view of human nature, long ago proposed by Leibnitz, and modifying it in the light of modern studies" (*op. cit.*, p. 545). The fundamental assumptions of this theory are that a monad is an ultimate reality; that it is potentially, at least, a thinking striving self, endowed with the faculty or power of true memory, and that the normal human personality is essentially a society of such

monads, living in harmonious co-operation in virtue of the integration of them all in one system. This is obviously not the place to criticise this addition to the theory. Here we can say only that in our view it is simply a translation of certain provisionally accepted facts of abnormal mental conditions into other terms, and that as each monad is potentially at least a complete self, it leaves us with all the problems of selfhood still on our hands.

PHYSIOLOGICAL GLOSSARY

Central Nervous System.—The Cerebro-spinal Axis—*i.e.*, the Brain and Spinal Cord. It is called central in distinction from the "peripheral" nervous system constituted by the nerves (cerebro-spinal and sympathetic) distributed throughout the body.

Cerebro-Spinal Nerves.—Nerves which are connected at one end with the Brain and Spinal Cord, and at the other break up into branches which terminate in the skin, muscles, and other structures of the body. They are of two varieties: (*a*) Sensory or Afferent, along which the nervous current passes inward to the spinal cord or brain; and (*b*) Motor or Efferent, along which the current passes outward to the muscles and glands.

Sympathetic Nerves.—Nerves which on the one hand are connected with little masses of nervous substance called ganglia, and on the other are distributed to the viscera and blood-vessels. The principal ganglia are arranged in two chains, one on each side of the spinal column. Branches of communication pass between the sympathetic system and the cerebro-spinal. The sympathetic nerves are the nerves of organic sensation (cf. p. 149ff.).

Cerebrum.—The mass of nervous matter occupying the upper portion of the skull. It is divided into two hemispheres, which are connected by nerve fibres. The external layer is termed the Cortex or *grey matter* of the cerebrum, and is thought to be exclusively the organ of consciousness.

Neurone.—The unit of the nervous system, consisting of a nucleated mass of protoplasm termed the cell-body or nerve-cell, and the protoplasmic processes continuous with the cell-body. Many nerve-cells have a number of short finely branching processes, and a single long process, called the axis cylinder or axon, which may reach a length of three or four feet. The cerebro-spinal nerves consist of bundles of these processes, bound together by connective tissue.

The great majority of nerve fibres consist of an axis cylinder process, surrounded by two protective sheaths.

Neurone Doctrine.—The doctrine according to which the Nervous System is built up of separate neurones between which there is no protoplasmic continuity. This theory is opposed by another which holds that the nervous network is continuous. The difficulty of microscopic investigation of the supposed junctions between neurones is extreme, so that our knowledge of them is still very imperfect.

Brain-Centre.—A number of nerve-cells which act together for the performance of some special function.

Pineal Gland.—An internal part of the brain about the size of a pea. It is not composed of nervous matter, but is now regarded by embryologists as the representative of a third eye which has fallen into disuse. It occurs singly in a part of the brain where the organs are otherwise duplicated; hence the importance attached to it by Descartes.

Reflex Arc.—The nervous mechanism necessary for producing adaptive movement—consisting of a sensory nerve, a motor nerve, and the nerve-cells mediating between them. In the case of pure reflex movements, the mediating cells are situated in the spinal cord or basal ganglia of the brain, and the nervous current passes round this single arc. These cells form junctions with the axons of neurones, the cells of which are situated in the sensori-motor area of the Cortex, and this double arch is termed a sensori-motor arc of the second level. In this book the arcs of the first level (the single arches) are termed reflex arcs simply, the arcs of the second level (the double arches) sensori-motor arcs.

Reaction Time.—The time taken to react on a stimulus. Simple reaction time is the time taken to give a definite response to a definite stimulus, both of which are known beforehand. Hence it is really the time required for the nervous stimulus to traverse a sensori-motor arc, usually of the second level. This time varies from one to three tenths of a second.

Hemi-Anæsthesia.—Lack of feeling in one lateral half of the body.

Hemiplegia.—Paralysis of one lateral half of the body.

Paraplegia.—Paralysis of the lower limbs.

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